Classification of Immune-mediated Polyarthritis in Dogs

Barrier function in dogs is a hot area of research right now—with new barrier-repair topicals showing promise in treating atopic dermatitis. How to get better pathology results? Find answers to your questions about submitting samples for cytologic and histologic examinations and communicating with pathologists—plus, tips for avoiding common mistakes. Recognizing and treating immune-mediated polyarthritis in dogs: This inflammatory joint condition presents in many forms, often causing systemic illness and sometimes causing cartilage and bone destruction. Learn to distinguish forms and what treatments induce remission and alleviate pain.

Atopy and skin barrier defects: How topicals may help

Getting optimal pathology results

Just Ask the Expert

Refractory anal sacculitis

Head tilt differentials

Treating IMHA

Sudden blindness and polyphagia

Portosystemic shunts

Surgical vs. medical therapy

Assessing nutritional status in dogs and cats

Identifying and treating immune-mediated polyarthritis
YOUR CARE gives pets the Lyme protection they deserve.

OUR SCIENCE gives you the peace of mind you need.

Powered by cutting-edge recombinant vaccine technology, RECOMBITEK® Lyme delivers OspA, the only antigen needed to stimulate immunity against Lyme disease.\textsuperscript{1,2,3}

RECOMBITEK Lyme vaccine:

- Reduces the risk of reactions caused by unnecessary proteins and adjuvants
- In a study, shown to block infection before transmission can occur\textsuperscript{2}
- Provides long-lasting, one-year duration of immunity\textsuperscript{2}

Together, that means pure protection for dogs and puppies, and peace of mind for you.

Your knowledge. Our science. Their health.
### Editorial Advisory Board
Leading specialists who direct our content and ensure our editorial quality and integrity

<table>
<thead>
<tr>
<th>Name</th>
<th>Institution</th>
</tr>
</thead>
<tbody>
<tr>
<td>Joseph W. Bartges</td>
<td>Department of Small Animal Clinical Sciences</td>
</tr>
<tr>
<td></td>
<td>College of Veterinary Medicine</td>
</tr>
<tr>
<td></td>
<td>The University of Tennessee</td>
</tr>
<tr>
<td></td>
<td>Knoxville, Tennessee</td>
</tr>
<tr>
<td>Juliet R. Gionfriddo</td>
<td>Department of Clinical Sciences</td>
</tr>
<tr>
<td></td>
<td>College of Veterinary Medicine</td>
</tr>
<tr>
<td></td>
<td>and Biomedical Sciences</td>
</tr>
<tr>
<td></td>
<td>Colorado State University</td>
</tr>
<tr>
<td></td>
<td>Fort Collins, Colorado</td>
</tr>
<tr>
<td>Jacqueline C. Neilson</td>
<td>Animal Behavior Clinic</td>
</tr>
<tr>
<td></td>
<td>Portland, Oregon</td>
</tr>
<tr>
<td>David S. Bruyette</td>
<td>VCA West Los Angeles Animal Hospital</td>
</tr>
<tr>
<td></td>
<td>West Los Angeles, California</td>
</tr>
<tr>
<td>Joseph Harari</td>
<td>Veterinary Surgical Specialists</td>
</tr>
<tr>
<td></td>
<td>Spokane, Washington</td>
</tr>
<tr>
<td>Barrak Pressler</td>
<td>Department of Veterinary Clinical Sciences</td>
</tr>
<tr>
<td></td>
<td>School of Veterinary Medicine</td>
</tr>
<tr>
<td></td>
<td>Purdue University</td>
</tr>
<tr>
<td></td>
<td>West Lafayette, Indiana</td>
</tr>
<tr>
<td>Timothy M. Fan</td>
<td>Department of Veterinary Clinical Medicine</td>
</tr>
<tr>
<td></td>
<td>College of Veterinary Medicine</td>
</tr>
<tr>
<td></td>
<td>University of Illinois</td>
</tr>
<tr>
<td></td>
<td>Urbana, Illinois</td>
</tr>
<tr>
<td>Karen A. Morielo</td>
<td>Department of Medical Sciences</td>
</tr>
<tr>
<td></td>
<td>School of Veterinary Medicine</td>
</tr>
<tr>
<td></td>
<td>University of Wisconsin</td>
</tr>
<tr>
<td></td>
<td>Madison, Wisconsin</td>
</tr>
<tr>
<td>Robert Prosek</td>
<td>Department of Small Animal Clinical Sciences</td>
</tr>
<tr>
<td></td>
<td>College of Veterinary Medicine</td>
</tr>
<tr>
<td></td>
<td>University of Florida</td>
</tr>
<tr>
<td></td>
<td>Gainesville, Florida</td>
</tr>
<tr>
<td>Mili Bass</td>
<td>Bass Veterinary Consulting &amp; Relief</td>
</tr>
<tr>
<td></td>
<td>Farragut, Tennessee</td>
</tr>
<tr>
<td>Jennifer McDermott</td>
<td>Banfield, The Pet Hospital</td>
</tr>
<tr>
<td></td>
<td>Overland Park, Kansas</td>
</tr>
<tr>
<td>Robin Downing</td>
<td>Windsor Veterinary Clinic PC</td>
</tr>
<tr>
<td></td>
<td>Windsor, Colorado</td>
</tr>
<tr>
<td>Melissa M. Mckendry</td>
<td>Pet Care Veterinary Hospital</td>
</tr>
<tr>
<td></td>
<td>Virginia Beach, Virginia</td>
</tr>
<tr>
<td>Fred L. Metzger Jr.</td>
<td>Metzger Animal Hospital</td>
</tr>
<tr>
<td></td>
<td>State College, Pennsylvania</td>
</tr>
<tr>
<td>Robert M. Miller</td>
<td>Thousand Oaks, California</td>
</tr>
<tr>
<td>Gary D. Norsworthy</td>
<td>Alamo Feline Health Center</td>
</tr>
<tr>
<td></td>
<td>San Antonio, Texas</td>
</tr>
<tr>
<td>R. Wayne Randolph</td>
<td>Countryside Veterinary Hospital</td>
</tr>
<tr>
<td></td>
<td>Flemington, New Jersey</td>
</tr>
<tr>
<td>Michael H. Rieger</td>
<td>Northwest Animal Clinic, Hospital and Specialty Practice</td>
</tr>
<tr>
<td></td>
<td>Albuquerque, New Mexico</td>
</tr>
<tr>
<td>David Robbins</td>
<td>VCA West Bernardo Animal Hospital</td>
</tr>
<tr>
<td></td>
<td>San Diego, California</td>
</tr>
<tr>
<td>Philip VanVranken</td>
<td>Dickman Road Veterinary Clinic</td>
</tr>
<tr>
<td></td>
<td>Battle Creek, Michigan</td>
</tr>
<tr>
<td>Laura L. Wade</td>
<td>Broadway Veterinary Clinic</td>
</tr>
<tr>
<td></td>
<td>Lancaster, New York</td>
</tr>
</tbody>
</table>

### Practitioner Advisory Board
Progressive practitioners who keep our content practical, timely, and relevant

<table>
<thead>
<tr>
<th>Name</th>
<th>Institution</th>
</tr>
</thead>
<tbody>
<tr>
<td>Joseph W. Bartges</td>
<td>Department of Small Animal Clinical Sciences</td>
</tr>
<tr>
<td></td>
<td>College of Veterinary Medicine</td>
</tr>
<tr>
<td></td>
<td>The University of Tennessee</td>
</tr>
<tr>
<td></td>
<td>Knoxville, Tennessee</td>
</tr>
<tr>
<td>Juliet R. Gionfriddo</td>
<td>Department of Clinical Sciences</td>
</tr>
<tr>
<td></td>
<td>College of Veterinary Medicine</td>
</tr>
<tr>
<td></td>
<td>and Biomedical Sciences</td>
</tr>
<tr>
<td></td>
<td>Colorado State University</td>
</tr>
<tr>
<td></td>
<td>Fort Collins, Colorado</td>
</tr>
<tr>
<td>Jacqueline C. Neilson</td>
<td>Animal Behavior Clinic</td>
</tr>
<tr>
<td></td>
<td>Portland, Oregon</td>
</tr>
<tr>
<td>David S. Bruyette</td>
<td>VCA West Los Angeles Animal Hospital</td>
</tr>
<tr>
<td></td>
<td>West Los Angeles, California</td>
</tr>
<tr>
<td>Joseph Harari</td>
<td>Veterinary Surgical Specialists</td>
</tr>
<tr>
<td></td>
<td>Spokane, Washington</td>
</tr>
<tr>
<td>Barrak Pressler</td>
<td>Department of Veterinary Clinical Sciences</td>
</tr>
<tr>
<td></td>
<td>School of Veterinary Medicine</td>
</tr>
<tr>
<td></td>
<td>Purdue University</td>
</tr>
<tr>
<td></td>
<td>West Lafayette, Indiana</td>
</tr>
<tr>
<td>Timothy M. Fan</td>
<td>Department of Veterinary Clinical Medicine</td>
</tr>
<tr>
<td></td>
<td>College of Veterinary Medicine</td>
</tr>
<tr>
<td></td>
<td>University of Illinois</td>
</tr>
<tr>
<td></td>
<td>Urbana, Illinois</td>
</tr>
<tr>
<td>Karen A. Morielo</td>
<td>Department of Medical Sciences</td>
</tr>
<tr>
<td></td>
<td>School of Veterinary Medicine</td>
</tr>
<tr>
<td></td>
<td>University of Wisconsin</td>
</tr>
<tr>
<td></td>
<td>Madison, Wisconsin</td>
</tr>
<tr>
<td>Robert Prosek</td>
<td>Department of Small Animal Clinical Sciences</td>
</tr>
<tr>
<td></td>
<td>College of Veterinary Medicine</td>
</tr>
<tr>
<td></td>
<td>University of Florida</td>
</tr>
<tr>
<td></td>
<td>Gainesville, Florida</td>
</tr>
<tr>
<td>Mili Bass</td>
<td>Bass Veterinary Consulting &amp; Relief</td>
</tr>
<tr>
<td></td>
<td>Farragut, Tennessee</td>
</tr>
<tr>
<td>Jennifer McDermott</td>
<td>Banfield, The Pet Hospital</td>
</tr>
<tr>
<td></td>
<td>Overland Park, Kansas</td>
</tr>
<tr>
<td>Robin Downing</td>
<td>Windsor Veterinary Clinic PC</td>
</tr>
<tr>
<td></td>
<td>Windsor, Colorado</td>
</tr>
<tr>
<td>Melissa M. Mckendry</td>
<td>Pet Care Veterinary Hospital</td>
</tr>
<tr>
<td></td>
<td>Virginia Beach, Virginia</td>
</tr>
<tr>
<td>Fred L. Metzger Jr.</td>
<td>Metzger Animal Hospital</td>
</tr>
<tr>
<td></td>
<td>State College, Pennsylvania</td>
</tr>
<tr>
<td>Robert M. Miller</td>
<td>Thousand Oaks, California</td>
</tr>
<tr>
<td>Gary D. Norsworthy</td>
<td>Alamo Feline Health Center</td>
</tr>
<tr>
<td></td>
<td>San Antonio, Texas</td>
</tr>
<tr>
<td>R. Wayne Randolph</td>
<td>Countryside Veterinary Hospital</td>
</tr>
<tr>
<td></td>
<td>Flemington, New Jersey</td>
</tr>
<tr>
<td>Michael H. Rieger</td>
<td>Northwest Animal Clinic, Hospital and Specialty Practice</td>
</tr>
<tr>
<td></td>
<td>Albuquerque, New Mexico</td>
</tr>
<tr>
<td>David Robbins</td>
<td>VCA West Bernardo Animal Hospital</td>
</tr>
<tr>
<td></td>
<td>San Diego, California</td>
</tr>
<tr>
<td>Philip VanVranken</td>
<td>Dickman Road Veterinary Clinic</td>
</tr>
<tr>
<td></td>
<td>Battle Creek, Michigan</td>
</tr>
<tr>
<td>Laura L. Wade</td>
<td>Broadway Veterinary Clinic</td>
</tr>
<tr>
<td></td>
<td>Lancaster, New York</td>
</tr>
</tbody>
</table>
Every cat needs broad-spectrum flea protection against hitchhikers.

Every cat is vulnerable to flea infestation, even those that only live indoors. Their family and other pets can unknowingly pick up fleas and bring them inside the home. This is why every cat needs the broad-spectrum flea protection provided by Vectra® brand topicals:

▼ Rapidly kills adult fleas.
▼ Kills on contact; fleas don’t have to bite to die.
▼ Controls all immature stages of fleas (eggs, larvae and pupae) to stop infestation and prevent re-infestation.
▼ Helps reduce the risk of flea-borne diseases and conditions like FAD, bartonellosis, and tapeworms.

So when your client says, “But my cat never goes outside,” explain the risks of hitchhiking fleas and recommend Vectra.

Call: 800-999-0297
Log on: summitvetpharm.com
Email: info@summitvetpharm.com

©2011 Ceva Animal Health, LLC, Rutherford, NJ 07070. 800-999-0297
All trademarks are the property of their respective owners.
Departments

113 Leading Off
A slice of advice on assessing your patients’ nutritional status
–Joseph W. Bartges, DVM, PhD, DACVIM, DACVN

114 Research Updates
Portosystemic shunts in dogs: Can medical therapy allow a delay in surgery?
–Scott Owens, DVM, and Barrak Pressler, DVM, PhD, DACVIM

118 Just Ask the Experts
• A protocol for treating IMHA
  –Christopher G. Byers, DVM, DACVECC, DACVIM
• Sudden blindness and polyphagia in a dog—Christopher G. Byers, DVM, DACVECC, DACVIM
• Differential diagnoses in a dog with a head tilt—David S. Bruyette, DVM, DACVIM
• Anal sacculitis refractory to standard treatment—Paul Bloom, DVM, DACVD, DABVP

123 Idea Exchange
Clipping fluid lines into place, and more tips from your colleagues

154 Mind Over Miller
A bit of design advice
–Robert M. Miller, DVM

Reader Resources

152 Showcase and Marketplace

VETERINARY MEDICINE®
dvm360.com

126 Addressing epidermal barrier function in canine atopic dermatitis
Jacqueline Gimmler, DVM, and Jenise Daigle, DVM, DACVD
Epidermal barrier function in dogs is a hot area of research right now—with new barrier-repair topicals showing promise in treating atopic dermatitis.

132 How to get better pathology results
Seth Chapman, DVM, MS, DACVP (clinical pathology), and Jason Roberts, DVM
Find answers to your questions about submitting samples for cytologic and histologic examinations and communicating with pathologists—plus, tips for avoiding common mistakes.

140 Recognizing and treating immune-mediated polyarthritis in dogs
Caroline M. Kiss, DVM, DABVP (canine and feline practice), and Gregory C. Troy, DVM, MS, DACVIM
This inflammatory joint condition presents in many forms, often causing systemic illness and sometimes causing cartilage and bone destruction. Learn to distinguish these forms and what treatments induce remission and alleviate pain.

❖PEER-REVIEWED
All feature articles have been reviewed by at least two board-certified specialists or recognized experts to ensure accuracy, thoroughness, and suitability.
BIG NEWS

VETORYL® (trilostane) is now available in 10 mg capsules!

What do dogs who take VETORYL® (trilostane) have in common?

Results like these.

Effective treatment for Cushing’s syndrome is now FDA approved for dogs of any size.

Access to the most powerful weapon in the fight against canine Cushing’s syndrome just got easier. VETORYL Capsules are the only FDA veterinary-approved treatment for pituitary-dependent and adrenal-dependent hyperadrenocorticism.

Now available in 10 mg, 30 mg, and 60 mg capsules!

VETORYL Capsules contain the active ingredient trilostane, which blocks the excessive production of cortisol. Daily administration of VETORYL can greatly reduce the clinical signs associated with Cushing’s syndrome, enhancing the quality of life for both dog and owner. For more information, visit www.VETORYL.com.

Contact your veterinary distributor to order VETORYL Capsules today!

See brief summary on page 112

VETORYL is a trademark of Dechra Ltd. ©2009, Dechra Ltd. NADA 141-261, Approved by FDA

As with all drugs, side effects may occur. In field studies, the most common side effects reported were poor/reduced appetite, vomiting, lethargy, diarrhea, and weakness. Occasionally, more serious side effects, including severe depression, hemorrhagic diarrhea, collapse, hypoadrenocortical crisis, or adrenal necrosis/rupture may occur, and may result in death. VETORYL Capsules are not for use in dogs with primary hepatic or renal disease, or in pregnant dogs. Refer to the prescribing information for complete details or visit www.VETORYL.com.

See brief summary on page 112
Daily Dose

Have You Heard? Lowering the dose for ACTH stimulation

A new study investigates the most efficient protocol for determining the degree of adrenocortical insufficiency or critical illness-related corticosteroid insufficiency in cats.

Daily Dose

Check out this online exclusive for a daily dose of clinical tips and quips.

Sign up.

To receive a monthly e-mail linking you to Veterinary Medicine Digital, send an e-mail to join-VM_digital@listmgr.advanstar.com, and write Digital Edition in the subject line.

Electing appropriate pain control

Feline specialist Dr. Susan Little discusses pain management for cats that undergo onychectomy.

Got questions? Get expert answers

Submit your questions to dvm360.com/myquestion. Or send an e-mail to vm@advanstar.com with the subject line Just Ask the Expert.

Visit dvm360.com/jjustask to read previous questions and answers.

Veterinary Medicine (ISSN 8750-7943; print, ISSN 1939-1919 online) is published monthly by Advanstar Communications Inc., 131 West First St., Duluth, MN 55802-2065. One year subscription rates: $59 in the United States & Possessions; $70 in Canada and Mexico; $95 all other countries. Foreign subscribers can pay in U.S. funds. Single issue orders $10 a copy in the United States, $15 in all other countries. Periodicals postage paid at Duluth, MN 55802 and additional mailing offices.

POSTMASTER: Please send address changes to Veterinary Medicine, P.O. Box 6087, Duluth, MN 55806. Canadian GST Number R1241313RT001. Publications Mail Agreement Number 40612608. Return undeliverable Canadian addresses to: Pitney Bowes, P.O. Box 25542, London, ON N6G 6B2, Canada. Printed in the U.S.A.

Copyright ©2011 Advanstar Communications Inc. All rights reserved. No part of this publication may be reproduced or transmitted in any form or by any means, electronic or mechanical including by photocopy, recording, or information storage and retrieval without permission in writing from the publisher. Authorization to photocopy items for internal/educational or personal use, or the internal/educational or personal use of specific clients is granted by Advanstar Communications Inc. for libraries and other users registered with the Copyright Clearance Center, 22 Rosewood Dr., Danvers, MA 01923, 978-750-8400 fax 978-646-8700. For use beyond those listed above, please direct your written request to Permission Dept. fax 440-891-2650.

Advanstar Communications provides certain customer contact data (such as customers’ names, addresses, phone numbers, and e-mail addresses) to third parties who wish to promote relevant products, services, and other opportunities which may be of interest to you. If you do not want Advanstar Communications to make your contact information available to third parties for marketing purposes, simply call toll-free (888) 527-7008 between the hours of 7:30 a.m. and 5 p.m. CST and a customer service representative will assist you in removing your name from Advanstar’s lists. Outside the United States, please call (218) 740-6505.

Veterinary Medicine does not verify any claims or other information appearing in any of the advertisements contained in the publication, and cannot take responsibility for any losses or other damages incurred by readers in reliance on such content. Publisher assumes no responsibility for unsolicited manuscripts, photographs, art, and other material. Unsolicited material will not be returned. Address correspondence to Veterinary Medicine, 8033 Flint, Lenexa, KS 66214; (913) 871-3800; e-mail vm@advanstar.com.
BRIEF SUMMARY (For Full Prescribing Information, see package insert)

CAUTION: Federal (USA) law restricts this drug to use by or on the order of a licensed veterinarian.

DESCRIPTION: VETORYL is an orally active synthetic steroid analogue that blocks production of hormones produced in the adrenal cortex of dogs.

INDICATIONS: VETORYL Capsules are indicated for the treatment of pituitary-dependent hyperadrenocorticism in dogs. VETORYL Capsules are indicated for the treatment of hyperadrenocorticism due to adrenocortical tumor in dogs.

CONTRAINdications: The use of VETORYL Capsules is contraindicated in dogs that have demonstrated hypersensitivity to triostane. Do not use VETORYL Capsules in animals with primary hepatic disease or renal insufficiency. Do not use in pregnant dogs. Studies conducted with triostane in laboratory animals have shown teratogenic effects and early pregnancy loss.

WARNINGS: In case of overdosage, symptomatic treatment of hyperadrenocorticism with corticosteroids, mineralocorticoids and intravenous fluids may be required. Angiotensin-converting enzyme (ACE) inhibitors should be used with caution with VETORYL Capsules, as both drugs have aldosterone-lowering effects which may be additive, impairing the patient’s ability to maintain normal electrolytes, blood volume and renal perfusion. Potassium-sparking diuretics (e.g., spironolactone) should not be used with VETORYL Capsules as both drugs have the potential to inhibit aldosterone, increasing the likelihood of hyperkalemia.

HUMAN WARNINGS: Keep out of reach of children. Not for human use. Wash hands after use. Do not empty capsule contents and do not attempt to divide the capsules. Do not handle the capsules if pregnant or if trying to conceive. Triostane is associated with teratogenic effects and early pregancy loss in laboratory animals. In the event of accidental ingestion/overdose, seek medical advice immediately and take the labeled container with you.

PRECAUTIONS: Hyperadrenocorticism can develop at any dose of VETORYL Capsules. A small percentage of dogs may develop corticosteroid withdrawal syndrome within 10 days of starting treatment. Mitotane (p-ODD) treatment will reduce adrenal function. Experience in foreign markets suggests that when mitotane therapy is stopped, an interval of at least one month should elapse before the introduction of VETORYL Capsules. The use of VETORYL Capsules will not affect the adrenal tumor itself. Adrenalecetomy should be considered as an option for cases that are good surgical candidates.

ADVERSE REACTIONS: The most common adverse reactions reported are poor/reduced appetite, vomiting, lethargy/dizziness, diarrhea, and weakness. Occasionally, more serious reactions including severe depression, hemorrhagic diarrhea, collapse, hyperadrenocortical crisis, or adrenal necrosis/necrosis may occur, and may result in death.

Editorial
Editor Margaret Rampey, mrampey@advanstar.com

Advantar Veterinary Content Group
Managing Editor Debbie Lovelace
Senior Editors Mindy Valcarcel; Brendan Howard; Liz Marsh
Assistant Editor Steve Bennaka
Associate Medical Director Theresa Entriken, DVM
Medical Editor Heather Lewellen, DVM
Technical Editor Jennifer Vossman, RVT
Consulting Technical Editor Avi Blake, DVM
Design Director Greg Kindred Senior Art Director Alison Fulton
Art Directors Josh Fultz; Melissa Galitz; Ryan Kramer
Multimedia Contributor Troy Van Horn

Advantar Communications Veterinary Group
Executive Vice President Daniel M. Phillips
Vice President/General Manager Becky Turner Chapman
Director, Electronic Communications Mark Eisler
Group Content Director Marnette Falley Editor, E-media Jessica Zemler
Director, Conventions, Meetings, & Events Peggy Shandy Lane
Circulation Joy Puzzo; Tammy Sundhomb-Otterson Production David Erickson
Group Sales Director David Doherty National Sales Manager Terry Reilly
Senior Account Managers, Advertising Chris Larsen; Todd Miller
Account Managers, Advertising Angela Paulovcin; Heather Townsend; Sharon Volcansek
National Sales Manager, Custom Veterinary Media Jed Bean
Sales & Projects Coordinator Anne Belcher
Sales & Marketing Coordinator Sabrina Killian

President, Chief Executive Officer Joe Loggia
Executive Vice President, Finance & Financial Officer Ted Alpert
Executive Vice President, Corporate Development Eric L. Lisman
Vice President, Information Technology J. Vaughn
Vice President, Electronic Media Group Mike Alic
Vice President, Media Operations Francis Heid
Vice President, Human Resources Nancy Nugent
Vice President, General Counsel Ward D. Hewins
Executive Vice President, Automotive, Dental, Powersports, & Veterinary Daniel M. Phillips

Mission Statement
Veterinary Medicine is a peer-reviewed journal dedicated to providing concise, credible, and essential information on the most common and crucial clinical problems seen in companion-animal practice.
A slice of advice on assessing your patients’ nutritional status

Joseph W. Bartges, DVM, PhD, DACVIM, DACVN

“He that takes medicine and neglects diet wastes the skills of the physician.”

~ Chinese proverb

People are more aware of the role of nutrition in their lives, and this awareness is applied to family members including their pets. Nutrition is integral to preventive healthcare and managing diseases. To provide an adequate and appropriate nutritional plan, it is necessary to assess a patient’s nutritional status and requirements. Nutritional assessment is an easy process that requires minimal expense in time and finances. It should be routine for all veterinary patients regardless of health status. Often, it involves a team approach that includes veterinarians, veterinary technicians, and staff—and, most important, clients.

On a snowy weekend in Denver in November 2009, the American Animal Hospital Association (AAHA) brought together a task force composed of two veterinary technicians; three veterinary nutritionists, including one who was also an internist; and two general practitioners (see boxed text). The charge for the task force was to develop nutritional assessment guidelines for cats and dogs were published in the July/August 2010 issue of the Journal of the American Animal Hospital Association with the aim of guiding decisions and criteria regarding diagnosis, dietary management, and treatment in specific areas of veterinary healthcare. The guidelines’ specific goals are to:

• Increase awareness in the profession about the importance of assessing nutritional status in dogs and cats
• Provide nutritional evaluation guidelines to promote optimal animal health and response to disease
• Supply the evidence and tools required to support nutritional recommendations in animals.

The guidelines provide a series of questions to be asked, body condition and muscle condition scoring systems, and methods of acquiring and analyzing information related to nutritional status. They provide recommendations for healthy patients as well as patients that are sick, including those requiring critical care. There are additional resources provided for veterinarians, veterinary technicians, and pet owners.

The guidelines can be found at aaahanet.org/resources/NutritionalGuidelines.aspx. Stay tuned—medicine and nutrition are dynamic. These guidelines will be updated to reflect new and innovative techniques and nutritional knowledge for the betterment of veterinary medicine and the benefits of our patients and companion-animal family members.

The AAHA Nutritional Assessment Guidelines Committee

• Kimberly Baldwin, CVT, VTS (ECC)
• Joe Bartges, DVM, PhD, DACVIM, DACVN
• Tony Buffington, DVM, PhD, DACVN, Chair
• Lisa M. Freeman, DVM, PhD, DACVN
• Mary Grabow, DVM
• Julie Legred, CVT
• Donald Ostwald, Jr., DVM, DABVP (canine and feline practice)

For the guidelines, go to aaha.org/resources/NutritionalGuidelines.aspx
Portosystemic shunts in dogs: Can medical therapy allow a delay in surgical intervention?

Most recent studies of dogs with congenital portosystemic shunts have investigated the relative efficacy and survival rates of novel surgical interventions. Although medical therapy can be attempted and the relative success at resolution of clinical signs and selected biochemical and histopathologic abnormalities have been compared, the survival times of dogs treated with medical therapy vs. dogs treated with surgery have not been compared. If medical management were to result in similar survival times as surgery, then veterinarians could more confidently offer this modality to owners of patients that are unable to tolerate the risks associated with surgery or when expense is a limiting factor. Conversely, differences in survival times may allow owners who are considering avoiding surgery to make more fully informed decisions as to the predicted lifespan of their pets. The authors of a new prospective study of dogs with single portosystemic shunts hypothesized that surgical vs. medical treatment would result in different survival times and that this difference may be influenced by shunt location.

This multicenter study compared short-term outcome and long-term survival of 126 dogs with a single congenital portosystemic shunt and associated clinical signs.
Treatment options were discussed with each dog owner at the time of diagnosis. Based on the recommendation of the attending clinician and financial considerations, owners ultimately decided whether medical or surgical treatment would be attempted; patients were not randomly distributed into the two treatment groups. Various surgical procedures were used for partial or complete shunt ligation depending on surgeon preference, and these procedures’ influence on survival was not evaluated separately. Medical management was not standardized but typically consisted of some combination of oral antibiotics, a modified protein diet, and lactulose.

The final study population included 99 surgically treated dogs and 27 dogs that had been medically managed. Despite the lack of randomization, no statistical differences existed between the two groups in regards to age at diagnosis (which has previously been identified as a prognostic indicator in dogs with portosystemic shunts), sex, or the proportion of dogs with intrahepatic or extrahepatic portosystemic shunts. Complete shunt ligation (39.4%) and the placement of ameroid ring constrictors (29.2%) were the most common surgical interventions.

At the time of data collection, 14 of 27 (51.9%) medically managed dogs and 87 of 99 (87.9%) surgically treated dogs were still alive. When considering dogs that had died and those still alive at the time of study termination, survival time was ≥ 3 years for 60% of medically treated dogs and 80% of surgically treated dogs. This difference was significant, with medically treated dogs having a greater likelihood of dying, particularly in the first two or three years after diagnosis, based on Kaplan-Meier survival graphs. The age of the dogs at the time of diagnosis and the shunt location were not significantly associated with survival.

Five of 99 (5.1%) surgically treated dogs died of complications secondary to their surgical procedures; however, deaths associated with the portosystemic shunt but unrelated to the surgical procedure were more common in medically treated dogs (8 of 27 [29.6%]) than in surgically treated dogs. Thus, this study’s results show that while both surgical and medical management may result in long-term survival in a subset of dogs, surgical treatment is associated with improved survival in the first three years and with overall significantly longer survival times.

**COMMENTARY**

Although not systematically studied, the presumptive reasons for the referral of dogs with portosystemic shunts are likely multifactorial, including the need for intensive management of severe preoperative hepatic encephalopathy, the technical expertise required for surgical correction, and the fear of severe complications during the immediate postoperative period. It is possible that based on the expense associated with these management and surgical considerations some dogs are euthanized rather than being referred for surgery. This study’s results provide owners and veterinarians additional information on the expected short- and long-term survival of medically managed dogs. Although surgery was definitively associated with a longer survival time after diagnosis, a median survival time > 3 years was still achieved in many dogs with medical therapy alone.

In this study, the authors failed to find that a dog’s age at the time of diagnosis affected survival, which had been shown to be important in a previous publication specifically evaluating medically managed dogs. Based on this finding, the authors conclude that surgical intervention could potentially...
be delayed in some dogs in favor of medical therapy if circumstances do not allow for immediate referral. However, this conclusion requires further study. In this study, most dogs underwent surgical intervention immediately after diagnosis rather than after a delayed period associated with medical management. Future studies should compare the survival times associated with immediate vs. delayed surgical intervention before veterinarians confidently recommend that owners can attempt medical therapy without later consequences.

The authors acknowledge that their nonrandomized study design may have led to marked bias and, therefore, potentially inaccurate results. As mentioned, clients were allowed to select the final treatment plan for their dogs, and recommendations made by the various surgeons were likely influenced by their personal success with surgical vs. medical therapy of portosystemic shunts, the severity of clinical signs in each particular dog, and the shunt location. For example, it is possible that dogs presenting with more severe hepatic encephalopathy were more likely to be considered poor surgical candidates by some surgeons or, conversely, would have been considered less amenable to medical therapy because of residual clinical signs. It is also possible that in those dogs in which surgery was not selected because of financial reasons, poor compliance with medication due to cost may have influenced survival times or willingness to aggressively manage patients that required occasional hospitalization because of worsening clinical signs. Finally, because only dogs with clinical signs were included in this study, whether the long-term survival of asymptomatic patients likewise differs depending on the method of treatment is unknown.

Ultimately, despite the bias involved in patient selection, these conclusions are encouraging for recommending medical management in cases in which surgical intervention cannot be immediately—or ever—considered. Owners should be informed that survival beyond three years occurs in more than 50% of cases, but median survival (time until death of 50% of patients) or effect on true long-term survival is still unknown. A dog’s quality of life during this period, meaning persistence of clinical signs due to hepatic encephalopathy, may still be worse than in surgically treated dogs and is ultimately unknown. The reasons why medical management is associated with shorter long-term survival were not investigated but are likely associated with previous authors’ findings that although medical management can be equally effective at controlling clinical signs of hepatic encephalopathy and correcting some or all biochemical abnormalities, progressive hepatic fibrosis occurs in dogs that do not undergo surgical correction.1

REFERENCES
NEW THOUGHT-PROVOKING HEARTWORM DATA USING A CHALLENGING STRAIN

Ask your Bayer Animal Health Consultant for more details today.

CAUTION: Available only from a licensed veterinarian. CONTRAINDICATIONS: Do not administer this product orally. Do not use this product on cats. WARNINGS: For the first 30 minutes after application: Ensure that dogs cannot lick the product from application sites on themselves or other treated dogs, and separate treated dogs from one another and from other pets to reduce the risk of accidental ingestion. Ingestion of this product by dogs may cause serious adverse reactions including depression, salivation, dilated pupils, incoordination, panting, and generalized muscle tremors. In avermectin sensitive dogs, the signs may be more severe and may include coma and death. HUMAN WARNINGS: Children should not contact application site for two (2) hours.

Bayer HealthCare Animal Health

© 2011 Bayer HealthCare LLC, Animal Health Division, Shawnee Mission, Kansas 66201. Bayer, the Bayer Cross, and Advantage Multi are registered trademarks of Bayer.

See brief summary on page 116
A protocol for treating IMHA

We are treating a dog in which immune-mediated hemolytic anemia was diagnosed 10 days ago. Initial treatment included prednisone and doxycycline. After five days of this treatment, the dog required a packed red blood cell transfusion, and we initiated cyclosporine, azathioprine, and aspirin. Five days after that (10 days into treatment), the dog’s hematocrit is still decreasing. Is there anything else we should be doing for the patient?

Immune-mediated hemolytic anemia (IMHA) is most commonly a primary disease, also called idiopathic IMHA. However, one common mistake practitioners can make is not being aggressive enough in identifying any underlying causes, such as neoplasia, that may make the IMHA a secondary disease. Make sure you have thoroughly investigated this possibility. This investigation should include an extensive history and thorough diagnostic testing.

IMHA is a complicated disease to treat. My typical initial treatment regimen for patients with confirmed IMHA in which no underlying primary disease is found (idiopathic IMHA) is similar to yours and includes

1. Immunosuppressive therapy—prednisone at 30 mg/m²/day orally; concurrent cyclosporine at 5 mg/kg every 12 hours orally or intravenously (other immunosuppressive medications to be aware of include azathioprine, mycophenolate mofetil, and leflunomide).
2. Gastroprotection—famotidine at 0.5 mg/kg orally every 12 hours
3. Immunomodulation—melatonin at 3 to 6 mg every 12 hours
4. Antimicrobial therapy—doxycycline at 5 to 10 mg/kg orally every 12 hours for 28 days
5. Antiplatelet aggregation therapy (the most common cause of morbidity and mortality in patients with IMHA is thromboembolism)—aspirin at 0.5 to 1 mg/kg/day orally

Also, for patients that do not seem to be responding to therapy in the first week, keep in mind that prednisone may take up to seven days to become effective. Similarly, oral cyclosporine may take up to two weeks and azathioprine up to three weeks to exert their effects. Therefore, other therapies of temporary benefit, such as administering packed red blood cells, may need to be initiated and potentially repeated while waiting for patients to respond to these immunosuppressive treatments.

In some refractory cases, I also recommend intravenous immunoglobulin G (IVIg). There is limited and mixed research regarding the efficacy of this medication in patients with IMHA, but my anecdotal experience has been positive. The protocol I use is to infuse 0.5 g/kg intravenously over three to four hours for three consecutive days. Unfortunately, IVIg is a relatively expensive medication, and with limited proven efficacy, it may be hard to justify the expense.

There is an unfortunate lack of prospective research in our companion-animal species regarding the optimal immunosuppressive protocol, and each clinician seems to have his or her own preferences. The protocol detailed above has generally worked well for me, but as anyone who has been in practice for a while can attest, IMHA can truly be a frustrating disease to adequately control.

REFERENCE

More on IVIg therapy
Read Dr. Byers’ thoughts on using IVIg for immune-mediated hemolytic anemia at dvm360.com/IVIg.
INTERNAL MEDICINE

What’s causing this dog’s sudden blindness and polyphagia?

Alice, my patient and my own dog, has acutely and progressively gone blind over the past two weeks. She is a 13-year-old spayed female Staffordshire terrier. Her vaccination status is current, she is receiving internal and external parasite preventives, and she has had no exposure to toxins. She has not had any polyuria or polydipsia but has become noticeably polyphagic. She seems disoriented, and some movements are what I would call jerky or sudden. Her gait and the rest of her initial neurologic examination findings were normal. Her complete blood count, serum chemistry profile, and urinalysis results were normal, as were her pupil sizes and pupillary light reflexes. Could she have a tumor on her optic chiasm or another neurologic condition?

Alice’s clinical signs are interesting and, unfortunately, not very clear-cut. If the primary issue is ultimately a visual deficit with behavioral changes, perhaps the jerky movements are secondary to this deficit. However, these movement abnormalities may certainly be secondary to something more sinister such as a cerebellar lesion or a prosencephalic lesion, and, thus, multifocal disease must be considered.

I first recommend a blood pressure measurement and then a complete ophthalmic examination to rule out sudden acquired retinal degeneration syndrome (SARDS), progressive retinal atrophy (PRA), and a hypertensive retinopathy. This examination will also allow evaluation for possible optic neuritis. If no abnormalities are documented on ophthalmic examination, evaluation by a neurologist to follow with advanced imaging (particularly magnetic resonance imaging) and cerebrospinal fluid evaluation are likely needed.

CASE OUTCOME

After testing revealed a normal blood pressure, Alice was evaluated by an ophthalmologist, and SARDS was diagnosed. Female dogs may be more likely to develop SARDS, and, despite normal serum chemistry profile results, all dogs with SARDS should be specifically tested for Cushing’s disease. Owners of dogs with SARDS frequently report concurrent onset polyuria and polydipsia.

Clinically, SARDS is characterized by a loss of vision over one to two weeks. The retina appears normal at first but will degenerate over time. SARDS can be detected by chromatic pupillary light activity testing. Dogs with SARDS will have no response to red light and good response to blue light. A definitive diagnosis of SARDS should be established by electroretinography.

The cause of SARDS remains undiscovered, but one study says that SARDS may be a paraneoplastic syndrome, and there are other reports of some SARDS patients responding to intravenous immunoglobulin G (IVIg), thus raising suspicions for an immune-mediated process. Currently, there is no approved treatment for SARDS.

REFERENCES


Answer provided by Christopher G. Byers, DVM, DACVECC, DACVIM, VCA Referral Associates, Gaithersburg, Md.
We saw a 5-year-old spayed female rat terrier mix 11 days ago for acute onset of imbalance and stumbling. No nystagmus or nausea or change in mentation had been noted. On examination, the dog was ataxic and had a head tilt down and to the right. Its left ear was held erect, as was normal for both of the dog’s ears, but the right ear was held down. No nystagmus or spinal pain was noted. The dog appeared to have normal cranial nerve function, but we could not evaluate the ears or conscious proprioception reflexes. We initiated treatment with antibiotics, and there has been no change in clinical signs. What should be on our differential diagnosis list other than vestibular disease?

A. With the acute onset of signs that are nonprogressive in a 5-year-old dog, I think the most likely diagnosis is a brain infarction. You would need magnetic resonance imaging to confirm it, but given the patient’s history and examination results, this would be a likely diagnosis.

Often, we do not find an underlying cause for an infarction, but it would be a good idea to screen for hypothyroidism, check the urine for proteinuria, and obtain a blood pressure measurement to rule out hypertension. ❖

SUGGESTED READING

Endocrine emergencies
Don’t miss this presentation by internist Dr. Jane Gordon and many more internal medicine topics during the CVC in Washington, D.C., May 4-9, 2011. Visit TheCVC.com for more details and to register to attend.
TRESADERM® (thiabendazole-dexamethasone-neomycin sulfate)

ANTI-BACTERIAL
ANTI-INFLAMMATORY
ANTI-FUNGAL

TRESADERM is the clear and simple solution.
With antifungal, antibacterial and anti-inflammatory properties, TRESADERM tackles a wide range of skin and ear conditions. Triple-action, easy-to-apply TRESADERM – there’s no reason to stock anything else.

TRESADERM (thiabendazole-dexamethasone-neomycin sulfate) Dermatologic Solution

CAUTION: Federal (U.S.A.) law restricts this drug to use by or on the order of a licensed veterinarian.

DESCRIPTION: Dermatologic Solution TRESADERM® (thiabendazole-dexamethasone-neomycin sulfate solution) contains the following active ingredients per ml: 40 mg thiabendazole, 1 mg dexamethasone, 3.2 mg neomycin (from neomycin sulfate). Inactive ingredients: glycercin, propylene glycol, purified water, hypophosphorous acid, calcium hypophosphate; about 8.5% ethyl alcohol and about 0.5% benzyl alcohol.

INDICATIONS: Dermatologic solution TRESADERM is indicated as an aid in the treatment of certain bacterial, mycotic, and inflammatory dermatoses and otitis externa in dogs and cats. Both acute and chronic forms of these skin disorders respond to treatment with TRESADERM. Many forms of dermatosis are caused by bacteria (chiefly Staphylococcus aureus, Proteus vulgaris and Pseudomonas aeruginosa). Moreover, these organisms often act as opportunistic or concurrent pathogens that may complicate already established mycotic skin disorders, or otoacariasis caused by Otodectes cynotis. The principal etiologic agents of dermatomycoses in dogs and cats are species of the genera Microsporum and Trichophyton. The efficacy of neomycin as an antibacterial agent, with activity against both gram-negative and gram-positive pathogens, is well documented. Detailed studies in various laboratories have verified the significant activity thiabendazole displays against the important dermatophytes. Dexamethasone, a synthetic adrenocorticoid steroid, inhibits the reaction of connective tissue to injury and suppresses the classic inflammatory manifestations of skin disease. The TRESADERM formulation combines these several activities in a complementary form for control of the discomfort and direct treatment of dermatitis and otitis externa produced by the above-mentioned infectious agents.

DOSAGE AND ADMINISTRATION: Prior to the administration of Dermatologic Solution TRESADERM, remove the ceruminous, purulent or foreign material from the ear canal, as well as the crust which may be associated with dermatoses affecting other parts of the body. The design of the container nozzle safely allows partial insertion into the ear canal for ease of administration. The amount to apply and the frequency of treatment are dependent upon the severity and extent of the lesions. Five to 15 drops should be instilled in the ear twice daily. In treating dermatoses affecting other than the ear canal, it is recommended the surface of the lesions should be well moistened (2 to 4 drops per square inch) with Dermatologic Solution TRESADERM twice daily. The volume required will be dependent upon the size of the lesion. Application of TRESADERM should be limited to periods not longer than one week. While systemic side effects are not likely with topically applied corticosteroids, such a possibility should be considered if use of the solution is extensive and prolonged. If signs of salt and water retention or potassium excretion are noted (increased thirst, weakness, lethargy, oliguria, gastrointestinal disturbances or tachycardia), treatment should be discontinued and appropriate measures taken to correct the electrolyte and fluid imbalance. Store in a refrigerator 36°-46°F (2°-8°C).

WARNING: For topical use in dogs and cats. Avoid contact with eyes. Keep this and all drugs out of the reach of children. The Material Safety Data Sheet (MSDS) contains more detailed occupational safety information. To report adverse effects in users, to obtain a MSDS, or for assistance call 1-800-672-6372. How Supplied: Product 55871- Dermatologic Solution TRESADERM Veterinary is supplied in 15-ml and 7.5-ml dropper bottles, each in 12-bottle boxes.

©2010 Merial Limited, Duluth, GA. All rights reserved. TRESADERM is a registered trademark of Merial.
I am treating a 5-year-old Great Dane that has anal sacculitis. Standard treatment consisting of cephalaxin; an antibacterial, anti-inflammatory, and antifungal ointment; and a tapering dosage of hydrocortisone has been unsuccessful. I’m trying to avoid surgery. Any ideas?

Before increasing your systemic therapy dosages or performing more frequent local treatments, you should ensure that the anal sacs are the real problem. Anal pruritus unrelated to anal sacs can mimic the clinical signs of anal sacculitis, but the two are distinguishable. If anal sacculitis is truly the problem, the pruritus should resolve after the anal sacs are expressed.

Conflicting reports exist regarding the value of gross and cytologic examination of anal sac exudates in diagnosing anal sacculitis. This is because of the extreme heterogeneity in color, consistency, amount of solid material, inflammatory cells, bacteria, yeast and RBCs contained in the expressed secretions from both normal and affected dogs. Some reports correlated anal sacculitis with the presence of large numbers of non-degenerative neutrophils and intracellular bacteria. However, in the most recent study, there were dogs with anal sac disease that had minimal to no inflammation nor bacteria present on cytology, and there were normal dogs with large numbers of inflammatory cells and bacteria present on cytology. Thus the numbers of inflammatory cells and bacteria are not statistically different between normal dogs and dogs with anal sac disease.

Anal sacculitis may be associated with allergies, perianal fistulas, and gastrointestinal disease, particularly if the stools are not well-formed. It may also be idiopathic.

Recommended initial treatment protocols include frequent manual expression of the anal sacs, an increase in dietary fiber, locally infused combination antibiotic and corticosteroid products, and systemic use of corticosteroids. For grossly infected anal sacs, systemic antimicrobials may be initiated but are rarely effective.

For refractory cases, anal sacculectomy is frequently the best treatment option.

REFERENCES
The myriad of non-therapeutic pet food choices available today can be daunting to both pet owners and veterinary practitioners, who are often called upon by clients to recommend the best diet for their pets. A group of veterinary professionals recently gathered to talk about the importance of discussing nutrition with clients, the growth in natural pet foods and what is needed to recommend non-therapeutic diets with confidence, and the necessity of ensuring the quality and safety of pet foods.

Dr. Sherry Sanderson: Let’s start with basic nutrition. In conversations with clients on various aspects of health, how frequently do you discuss basic nutrition?

Dr. Ellen K. Cook: I always ask clients what they are feeding their pets, not just for life stages but also depending upon the state of a pet’s health (e.g. the pet may be obese or diabetic or have joint health problems). But even with normal, healthy patients, it is important to address nutrition.

Dr. Peter Sakas: It’s a big part of our client education. Our technicians play a very important role in these discussions. I’ll introduce clients to the concept of the proper diet for their pets, and the technician will take it from there.

Dr. Andrea La Raus: Many of my clients view their pets as extensions of their family, so nutrition is really on their minds. It’s an important part of the conversation through kitten and puppy stages and on through to adulthood. Diet is also very important for my geriatric patients, who often have special needs.

Julie Legred: I agree that nutrition plays a big role in every life stage, and it should be talked about with every client. Technicians and staff spend a lot of time with clients, so helping the whole hospital team deliver a clear, consistent message across the board is really important.
in the business of selling food to you, and I’m in the business of keeping your pet as healthy as possible. So, I encourage my clients to come in with a long list of questions. That’s when technicians are very helpful. My appointment slots are a half hour. I probably spend half that time with the client and the rest of the time, my technician is with that client. The technician’s assistance in educating the client is as important as my own.

**La Raus:** The breeder or pet store person—even some of the websites out there—is so dogmatic in presenting nutrition, as if it is black and white. I think most of us would agree there are significant shades of gray. There is no one best solution for all pets.

**Legred:** Until they visit the veterinarian, hear what he or she has to say, and form a relationship, clients are going to rely on the breeder for information. That’s the first person they talk to. Clients want to do everything perfectly for their pets, so they listen to the first person they hear recommendations from to immediately care for their pets.

**Sanderson:** Where do you turn for information and education on nutrition?

**La Raus:** I rely heavily on VIN, especially the clinical nutrition folder and some of their online continuing education. The ACVN (American College of Veterinary Nutrition) website is also informative. There are other online self-paced courses that I have found helpful.

**Cook:** There is a lot of good information and continuing education available, including on pet food websites.

**Legred:** There’s also a lot of nutrition education specifically available to technicians.

**Sakas:** A lot of the continuing education and client education handouts we receive help with clients, too. Materials such as the AAHA guidelines and assessment reinforce our discussions. We also give handouts to clients with all our instructions to take home.

**La Raus:** In addition to handouts, websites that you can refer clients to are good as well. They may displace a handout, but they’ll bookmark links and go back to them.

**Cook:** I recommend websites of some of the more reputable pet food companies to clients, such as The Nutro Company, Hill’s Pet Nutrition or The Iams Company, and have links to those websites on my clinic website.

**Natural and organic pet foods**

**Sanderson:** It sounds as if you are comfortable talking about nutrition with your clients. Any areas where you are perhaps less comfortable?

**La Raus:** Yes, one of my questions involves foods labeled as natural or human-grade. I have difficulty talking about that with my clients and don’t know that I truly understand what those mean.

**Cook:** I have the same question, too. What exactly is natural? And what is organic?

**Sanderson:** Sounds like a good time to discuss the differences between natural, organic and human-grade. Those terms are often used interchangeably, but they are really not the same. Organic implies the way in which the plants or the animals were raised, and while there’s no pet standard, the pet food industry follows the human organic program. If a pet food is organic, it actually should contain an organic seal that denotes it meets the human standard. Natural implies that there are no chemical or synthetic materials in the diet. There is a big difference between these two terms, and I don’t think very many clients understand that difference. And regarding human-grade, there is no absolute standard for human-grade and a lot of the ingredients that go into pet food are human-grade. Clients assume that it means a higher level of safety, but that’s not the case. Almost every week there’s news about an issue in the human food chain, whether it’s salmonella in peanut butter or E. coli on spinach. You are not alone; I’m sure there are many excellent practitioners still uncomfortable discussing natural, organic and the like with clients. We don’t want to misinform them; we want to answer their questions knowledgeably. I think that’s important.

**Sakas:** It seems to be quite a trend with our clients now because some want diets that are natural and holistic. We even see this with medications—clients would rather sometimes treat disease conditions holistically.

**Cook:** In recent months, several clients have told me they’re feeding their dog or cat gluten-free, corn-free, grain-free, or something else-free and believe it’s the best thing.

**Sanderson:** Extremes in a diet are not necessarily the best way to go. When grains are removed, you’re cutting a lot of very important fiber sources out of that diet. There is no reason to go grain-free for a normal healthy animal. It is just one of those niches that has developed and seems appealing to a lot of clients. Unfortunately, I think it is doing a disservice.

**Sakas:** Along this track, I’d like to comment on another pet food fad: raw diets. People are always talking about the BARF (biologically appropriate raw food or bones and raw food) diet. I tell my clients to avoid them because of potential risks with these diets. But it seems to be a trend that’s being talked about quite a bit.

**Sanderson:** I agree. Raw diet advocates are very passionate about it and do not want to be told anything else. I think it’s an area of concern in that those who recommend raw diets are opening themselves up for litigation.

**Legred:** This is something we will continually have to deal with. We need to educate clients on why they shouldn’t be feeding a raw diet. We’ll encounter some clients who insist on
doing this despite our recommendations, and we’ll need to especially follow up on these individual patients.

La Raus: Along these lines, sometimes when I recommend a therapeutic diet—be it for skin, renal, hepatic or other issues—clients look at the ingredient label for those buzz words natural, organic or holistic. If they are not satisfied with the labeling, they reject the diet and then search for something over the counter that, in their minds, is the same thing or better. It’s been a real frustration for me.

Cook: I had that same problem. One of the things I have found helpful is telling clients this is what I recommend and would use with my own pet. For non-therapeutic diets, I tell them this is what I have fed my own dogs and cats for a number of years.

Recommending non-therapeutic diets

Sanderson: Talking about non-therapeutic diets that you recommend, on what do you base your recommendation?

Sakas: It’s the quality of the ingredients. In addition, we see so many allergies in dogs. One of the first things I evaluate in an allergic dog is the diet. We now have so many different types of novel protein diets. If a dog has a food-ingredient allergy, we can attempt to eliminate those allergens, so we talk to the client about changing the diet. Clients are on board with this as long as you can explain it to them. That’s probably the most important thing.

Legred: For me, it’s the research behind it. AAFCO certification of “complete and balanced” plays a big part, too.

Cook: Because everybody has jumped on the premium diet bandwagon in recent years, I also recommend only those diets that have stood the test of time in addition to meeting AAFCO requirements and diets that I have fed to my own pets. I pretty much stick with HILL’S, EUKANUBA and NUTRO® pet food as my standard basic recommendations. Then I vary that according to an animal’s specific health condition or stage of life.

Legred: I think it’s also the reputation of the company and materials that are available to help and educate technicians and veterinarians.

La Raus: The availability of a diet is a factor as well. If there’s a diet that is effective but has limited availability, client compliance is not going to be great. A peer’s experience with a food is also really helpful to me. There are so many choices. Sometimes you find out that pet food is not the main business of the parent company and they’re just jumping on the bandwagon.

Sakas: With me, it’s mostly based on personal experience. Through the years, we’ve all had good and bad experiences with food. So, when you’re comfortable with a certain diet you can suggest it to your client in good faith. I also like a company being receptive to questions and concerns from the veterinarian and pet owner alike.

Sanderson: You bring up a good point. I think one very important thing that should be on a pet food label is a toll-free number. That tells me that the company makes it easy for practitioners to call them and welcomes their calls. The other thing is making sure there is someone at the other end of the line who can answer our questions. Let’s talk now about diets with additional nutritional benefits such as enhanced fatty acids or others. Do you recommend diets that contain those kinds of things?

Sakas: Not necessarily. Take the joint diets, for example. Is there a sufficient level of glucosamine to have a therapeutic effect? I really wonder about that.

La Raus: I will recommend diets with fatty acids especially for cats, only because I’m hoping that it can minimize how much medication the owners might have to give their cats.

Sanderson: You’re talking about diets that are supplemented with omega-3 fatty acids?

La Raus: Yes, with the hope that they contain therapeutic levels.

Sanderson: How about for animals that have sensitive GI tracts? Do you ever strive to get a diet that has prebiotics in it or anything for gut health?

Sakas: I’ve never really recommended those for that issue, but it’s a good idea.

Cook: I have recommended those diets more recently if the patient has chronic recurring problems.

Discussing and recommending natural foods to clients

Sanderson: Let’s talk a bit more about natural. More and more pet owners are interested in natural diets. What has been your experience with clients asking questions about natural foods?

Legred: It’s what many think they should be feeding. They are hearing that is what’s best for people, so it is natural for them to think that this is the route they should be going with their pets as well.

Cook: It has definitely been increasing in the last five years. I’ve noticed a big increase in clients’ concern that they are feeding a natural diet.

Sakas: If they see two bags and one says “all natural” and one is regular food, they are going to choose the natural. It’s a frame of mind.
La Raus: I had some patients that were affected during the melamine crisis. That really increased the questions and clients’ perception that if it’s natural, it must be safer. They are just trying to do the best they can for their pets.

Sanderson: What percentage of your clients currently feed a natural food?

La Raus: About 40 percent.

Cook: I would say probably 10 to 15 percent. But that’s a lot higher than it was ten years ago.

Sakas: I’m not sure of the exact percentage, but we certainly have more clients asking about natural foods.

Sanderson: If a client comes in with a question about a natural food, are you comfortable discussing that with them?

Sakas: Not too much, because we don’t really know what a “natural” food really is. I would say if it is really a quality food from a nutritional standpoint, then I am comfortable. I just don’t have the comfort level with some of these foods, yet because we don’t know the standards.

Cook: And there are new foods out every day. I’ll ask the client either to bring in the label, or I will try to find it on the Internet. I’ll always find a food online, but there will be no information on ingredients, AAFCO certification and so forth.

Legred: That’s a big red flag.

Cook: Yes, and that is exactly what I tell the client.

Legred: There are some companies that don’t even engage with veterinarians and technicians. Then you question whether it’s a food you can trust.

Cook: They will get a celebrity to tout their product, and then you can’t find any kind of basic nutritional information about it whatsoever.

La Raus: Or, they send their reps to the pet food stores. I’ve overheard many of those conversations with pet owners, and too often it’s just not good or valid information.

Sanderson: What kind of research would you like to see on natural diets?

Sakas: I’d like to see research that demonstrates that a natural food can fulfill the pet’s nutritional needs. Just because the ingredients are natural, is it also nutritionally complete and balanced? Also, I would like to know how well the food quality is sustained. I would have confidence in a natural food that provides complete and balanced nutrition as well as having an appropriate shelf life.

Legred: The quality of the ingredients.

Sanderson: What do you mean by quality?

La Raus: Digestibility and freshness.

Cook: The source of the nutrients. I tell my clients no matter what you read and see about our food safety problems, the United States has by far the safest food sources in the world. And the quality of the protein, too. I tell clients, “Look at what you eat. Look at how expensive your source of protein is. You can’t buy a good source of protein for ten cents a pound. The same thing is true for your pet.” Also, over the years I’ve seen patients given foods with high levels of preservatives, dyes and chemicals that have more skin and GI issues, but that is strictly anecdotal experience. But because of that, I don’t recommend those foods, and that would be a case where I feel a natural diet would be a better option.

Ensuring quality and food safety

Sanderson: We’ve talked about aspects of quality and food safety. How would you like manufacturers to address those areas?

Sakas: Explaining quality control and what they actually do to guarantee quality and safety would be good. How do they check and periodically test to make sure? I would like to know they are taking that extra step.

LaRaus: Cleanliness of the manufacturing facility is a factor, too.

Sanderson: That’s an important quality control as well as testing ingredients for pathogens like mycotoxin and various infectious elements in protein sources.

Legred: Actually being able to tour the manufacturing plants is great. To see the operation, controls, tests, research—everything that a product goes through. That builds more confidence.

Sakas: Manufacturers could help us and clients by posting information on their websites—frequently asked questions, addressing myths and misconceptions and so forth.

Cook: Or, perhaps also a virtual tour of manufacturing facilities and research on DVD for distribution to the general practitioner community.

La Raus: I think some people would respond that a company would, of course, say good things about their process and product because it’s in their interest to do so. It would be ideal to have a third party to qualify and disseminate quality and safety information. That would be more credible.

Sanderson: Any final thoughts?

Cook: After 35 years in practice, I find that the pet’s nutrition and its general lifestyle are the most important factors in keeping that pet healthy. I’m a firm believer in medication, but too often we reach for drugs to fix things that could be better addressed by a change in diet or lifestyle. That’s so important at every stage of a pet’s life and to building a bond and relationship with your clients. Diet is critical. You are what you eat.

LaRaus: As Hippocrates said, “Let food be your first medicine,” right?

Sanderson: That’s a great ending point. Thank you all for participating in today’s discussion.
Organize files—and avoid I-can’t-find-that-disk headaches—with pockets
To avoid headaches due to misplaced patient images, we keep copies of the disks containing digital radiographs, computed tomography scans, or magnetic resonance imaging inside the patient’s file in a small pocket or envelope. These pockets or envelopes can be purchased at any small-business supply store.
Dr. Ron Hodges, DACVIM
Allentown, Pa.

Clip fluid lines into place
I use small hair clips to hold the fluid line in place when giving subcutaneous fluids to a patient. The clips help keep the needle from slipping out and allow me to use less restraint because the line is clipped to the haircoat. Everyone involved is more comfortable.
Kathryn Chatt, CVT
Milton, N.H.

Get at-home dental care started with a kit
Every owner who brings in his or her dog or cat for a dental cleaning receives a mug filled with a toothbrush, toothpaste, a dental diet sample (Prescription Diet t/d—Hills Pet Nutrition), and handouts on tooth brushing, Oravet (Merial), and Greenies (The Nutro Company). We also throw in a pen that has our clinic’s name and phone number on it. At discharge, we encourage at-home care and give clients their dental starter kit, which they love.
Dr. Jennifer Usiak
Lynnfield, Mass.

Reuse vaccine trays for take-home syringes
Occasionally, we will dispense injectable medications in predrawn syringes for owners to administer at home. Vaccine trays are a good size for dispensing these syringes in. We just snap the tray top and bottom back together with the syringes inside and put the label on the tray. The tray keeps the syringes together in a compact container and helps prevent accidental depression of the plungers, which may happen if the syringes are sent home in a bag.
Dr. Aaron Knapp
Clinton Township, Mich.

Heating pads keep fluids toasty
To have warm fluids available when we need them, we lay a couple of unopened fluid bags on a heating pad set on low and then place another heating pad on top. This way warm fluids are always on hand but with less muss and fuss than with other methods. If we don’t use them, it’s no big deal.
Dr. Lee Roberts
Greencastle, Ind.

Send us your great idea, and we’ll send you $50!
E-mail us at vm@advanstar.com, send a fax to (913) 871-3808, or write to Idea Exchange Editor at 8033 Flint, Lenexa, KS 66214.
We want to hear your ideas!

We know you love to read Veterinary Medicine's “Idea Exchange.” And we'll bet your practice has developed many clinical and management tips or useful forms to help you save time and better serve your patients and clients. This is your chance to share your practice tips with your colleagues and make a little money on the side! Please take a moment to jot down your idea and send it to us.

This is my practice tip for “Idea Exchange”
(explain each tip in a few words, and feel free to include a sketch, a photo, or your favorite form if appropriate):

<table>
<thead>
<tr>
<th>NAME</th>
<th>POSITION</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(e.g. DVM, LVT, CVT, RVT, veterinary assistant, practice manager)</td>
</tr>
</tbody>
</table>

ADDRESS

Practice  Home

CITY

STATE/ZIP

PHONE  FAX  E-MAIL

We pay $50 for every idea we publish.
We educate according to three simple promises: one-on-one relationships with dedicated professors, small classes of like-minded students, and most importantly, extended time with animals. St. George's University School of Veterinary Medicine trains students to practice using both passion and science with clinical training in the US, Canada, UK, Australia, and Ireland.

Now approved to award US Department of Education loans.

“Excuse me, my name is not HereKittyKitty.”

THINK LIKE A CAT. TREAT LIKE A VETERINARIAN.

Grenada, West Indies • US/Canada 1 (800) 899-6337 ext. 9 1218 • sgu.edu/future-students • SGUEnrolment@sgu.edu •
Addressing epidermal barrier function in canine atopic dermatitis

Epidermal barrier function in dogs is a hot area of research right now— with new barrier-repair topicals showing promise in treating atopic dermatitis.

Jacqueline Gimmler, DVM, and Jenise Daigle, DVM, DACVD

Research and treatment modalities are evolving for atopic dermatitis, a chronic pruritic skin disease in dogs. Dogs with atopic dermatitis have seasonal to nonseasonal pruritus that is often accompanied by secondary bacterial and yeast infections. Lesions (erythema, alopecia, pustules, papules, and crusts) are usually worse on the face, feet, skin folds, and flexural surfaces and in areas of friction (Figure 1).

Classically, atopic dermatitis is thought to be caused by a genetic defect in the immune system, leading to a hypersensitivity to normal environmental allergens. Newer theories propose that genetic defects in skin lipids and proteins create a barrier defect that lets allergens into the body, stimulating an immune response. The study of skin barrier function in dogs is the subject of a lot of research, and measuring transepidermal water loss is commonly used to estimate barrier function. New topical treatments geared toward improving the skin barrier are emerging and may be useful additions to the classic atopic dermatitis treatment protocol.

TRANSEPIDERMAL WATER LOSS

To understand skin barrier defect research, a brief review of transepidermal water loss is necessary. A machine called an evaporimeter measures the amount of water evaporating from the skin. The evaporimeter can have an open or closed chamber, and a debate exists about which type is superior. Transepidermal water loss measurement is noninvasive and has been shown to be a good estimate of barrier function in dogs and people.

All animals lose a small amount of water through the skin, called perspiratio insensibilis. But atopic dogs lose higher amounts of water than normal dogs do. It is thought that the higher water loss dries out and irritates the skin, but more important, it signifies that the skin barrier is not working properly. If water is leaking out, allergens may be penetrating the barrier.

THE EPIDERMAL BARRIER

Most canine epithelial barrier research can be divided into two categories: research to determine the chemical content of skin and research with electron microscopy to determine the physical architecture of skin. Canine skin can be described as bricks and mortar, with epithelial cells making up the bricks and extracellular lipids and proteins making up the mortar.

The stratum granulosum of the epidermis produces lamellar bodies, which contain necessary lipids and enzymes needed for differentiation and desquamation of epithelial cells. The lamellar bodies are extruded into the extracellular space and form organized stacks called lamellae, which help prevent water loss.
Introducing DURAMUNE LYME for multi-Osp protection from Lyme disease

- Multiple outer surface proteins (Osp) deliver a cascade of protection for continuous, uninterrupted defense against Borrelia burgdorferi
- Proven 100 percent effective in challenge studies and 92 percent effective against natural infection in real-world dogs1-4
- Proven safe in the largest clinical study of its kind5

Keep your canine patients safe from the threat of Lyme disease.
Contact your Boehringer Ingelheim Vetmedica, Inc. or favorite distributor representative today.

Barrier function and atopy ❖ PEER-REVIEWED

and allergen penetration. Ceramides are a type of lipid that makes up a large portion of the lamellae. Dogs with atopic dermatitis have a skin deficiency of ceramides, and their lamellae are arranged in a disorderly manner.

TRADITIONAL TREATMENT
Treating canine atopic dermatitis usually involves a combination of therapeutic modalities. The mainstay of treatment is allergen-specific immunotherapy (allergy vaccines) (Figure 2), cyclosporine (Atopica—Novartis Animal Health), and low-dose alternate-day oral glucocorticoids. Adjunctive treatment includes antibiotics and antifungals to eliminate infection, strict flea control, diet trials, antihistamines, shampoos, and fatty acid supplementation.

NEW TOPICAL THERAPIES
Some new topical therapies have been developed with the goal of improving epidermal barrier function. The theory is that topically applying lipids to the skin stimulates it to produce its own lipids, leading to barrier repair. These therapies are different from supplementing fatty acids because they are administered directly onto the skin and because many of them provide ceramides, the most important lipid component of the skin barrier. It has been shown that the skin barrier cannot be disrupted unless ceramides are removed.

Allerderm Spot-On (Virbac Animal Health; $20 to $30 for a six-pack), a ceramide and fatty acid-containing liquid, is applied to the skin in a similar manner to monthly flea control products (Figure 3). The instructions for this product are to apply one pipette a week for four weeks and then one pipette a month for maintenance. A small study that evaluated skin biopsy samples with electron microscopy showed that after repeated application of this product, atopic dogs had higher concentrations of lamellar lipids in the stratum corneum compared with pretreatment concentrations.

Dermoscent Essential 6 spot-on (Laboratoire De Dermo-Cosmetique Animale, Castres, France) has been shown to decrease the severity of atopic dermatitis, pruritus, and transepidermal water loss in atopic dogs.

3. Allerderm Spot-On (Virbac Animal Health), a ceramide and fatty acid-containing liquid, has been shown to increase the concentration of lamellar lipids in the stratum corneum of atopic dogs.

4. Dermoscent Essential 6 spot-on (Laboratoire De Dermo-Cosmetique Animale, Castres, France; $15 to $20 for a four-pack) contains essential oils and fatty acids (Figure 4). The instructions for this product are to apply one pipette a week for eight weeks and then one pipette every two weeks for maintenance. In a small study, seven atopic dogs were treated with this product for eight weeks and had their canine atopic dermatitis extent and severity index (CADESI) scores measured before and after treatment. They had statistically significant improvement (P = 0.0043) in severity of disease, though there was not a control group.

Sogeval Laboratories makes a line of products containing phytosphingosine, a precursor to ceramides (Figure 5). Douxo Seborrhea Shampoo (Sogeval Laboratories; $50 to $65 for a 25-pack) can be used one or two times a week along with the Douxo Seborrhea Micro-emulsion Spray (Sogeval Laboratories). Douxo Seborrhea Spot-on (Sogeval Laboratories) can be used alone or in combination with the shampoo.
Over the past 20 years, fatty acids have emerged as an integral part of a daily health regimen for humans and animals alike. Essential fatty acids are important elements, helping to benefit pets from puppies and kittens to senior dogs and cats. DVM Pharmaceuticals continues to play a leading role in the evolution of fatty acids, building upon the growing body of scientific data to develop fatty acid products that optimize animal health and well-being.

DVM's Free Form Snip Tips capsules are manufactured in the free-fatty acid form, offering the maximum absorption of EPA and DHA available.

Please contact your DVM sales representative or visit tevaanimalhealth.com for more details.
Barrier function and atopy ❖ PEER-REVIEWED

or spray and should be applied once weekly for four weeks and then twice monthly for maintenance.

CONCLUSION
More research is needed to determine the efficacy of these new barrier-repair topicals. For years, dermatologists have emphasized grooming, coat hygiene, and bathing as adjunct treatments. The barrier-repair products take that idea one step further. In our opinion, lipid-containing topicals can be added to almost any atopic dermatitis case without causing harm. They may be more beneficial when skin infections are under control, since twice weekly bathing could remove the product. It does not seem likely that they will completely replace conventional therapies, but they may be a useful addition to the atopic dermatitis treatment arsenal if they can improve the efficacy of allergen-specific immunotherapy and allow for lower doses of glucocorticoids and cyclosporine.

REFERENCES

5. (Left to right) Douxo Seborrhea Shampoo, Seborrhea Micro-emulsion Spray, and Seborrhea Spot-on (Sogeval Laboratories) are a line of phytosphingosine-containing products.

Lipid-containing topicals can be added to almost any atopic dermatitis case without causing harm.

Derm CE up to your ears
Four board-certified dermatologists will speak on a variety of topics during the CVC in Washington, D.C., May 4-9. Highlights include
• Dermatophyte and deep fungal infections, Parts 1 & 2
  —Dr. Robert Kennis
• Derm Jeopardy: “I’ll take annoying parasites for $400”
  —Dr. John MacDonald
• Using topical therapy: How, why, and when?
  —Dr. Elizabeth May
• New drug therapies in veterinary dermatology
  —Dr. Christine Rees
Visit TheCVC.com for more details and to register to attend.

130 March 2011 VETERINARY MEDICINE dvm360.com
There are many choices veterinarians can make to be heroes to their patients. Dr. Timm England chooses to donate his time and medical services to fire rescue dogs. And, like more and more veterinarians, Dr. England chooses Interceptor Flavor Tabs. In fact, the medicine in Interceptor Flavor Tabs is trusted #1 by veterinarians for their own dogs.

Learn more at www.interceptorpet.com

*Milbemycin oxime is trusted #1 by veterinarians for their own dogs. – Data on file, Novartis Animal Health US, Inc. – NAHE.002.
© 2010 Novartis Animal Health US, Inc.
INTERCEPTOR and Flavor Tabs are registered trademarks of Novartis AG.
How to get better pathology results

Find answers to your questions about submitting samples for cytologic and histologic examinations and communicating with pathologists—plus, tips for avoiding common mistakes.

Seth Chapman, DVM, MS, DACVP (clinical pathology), and Jason Roberts, DVM

Practitioners frequently submit tissue and fluid samples to pathologists—typically employed at academic institutions, state laboratories, or private diagnostic laboratories—to assist them in the diagnosis of infectious diseases, inflammatory or metabolic disorders, and neoplasia in veterinary patients. Pathologists typically provide reports that include a description and interpretation of their findings, the degree of confidence in the diagnosis, a list of differential diagnoses, and recommendations for additional tests or procedures. The common goal for the practitioner and pathologist is to arrive at a correct diagnosis or to help narrow the list of differential diagnoses.

Sample submission complications that can result in an unsatisfactory outcome for practitioners include delay in obtaining a diagnosis, receiving an incorrect diagnosis, or receiving an inconclusive report. Many of these complications can be prevented if samples are submitted correctly and the practitioner and pathologist communicate well.

In this article, we answer common questions associated with pathology sample submission for cytologic and histologic examination and address a few of the problems that arise in the collection, submission, and interpretation of samples. The goal is to improve communication between practitioners and pathologists at all diagnostic laboratories and improve outcomes for optimal patient care.

IS SUBMITTING A HISTORY THAT IMPORTANT?

Obtaining a thorough history is important in clinical medicine, and that applies to pathology as well. Unfortunately, it is relatively common for samples to be submitted with little, if any, patient history. Without a thorough history, practitioners may receive pathology reports that seem noncommittal or indicate uncertainty in the diagnosis. Pathologists may be reluctant to commit or express a high degree of confidence in a diagnosis if the cytologic or histologic findings are not straightforward and a thorough history is not provided. Treatment protocols and even the decision to euthanize a patient may be based on pathology reports. Thus, in the absence of key information about the case, pathologists may often provide a conservative interpretation.

At a minimum, patient signalment and any significant abnormalities identified from the results of physical examination, blood work, or diagnostic imaging should be provided. Furthermore, providing a working diagnosis or differential diagnoses list is often helpful to the pathologist in making an interpretation or ruling in or ruling out specific diseases. This information is crucial for successful communication between practitioners and pathologists.

SHOULD THE SOURCE FOR THE SAMPLE BE IDENTIFIED?

A misconception exists that pathologists can interpret sample findings without knowing the specific source (e.g., tissue, body cavity). Practitioners may assume that if a cellular sample is obtained or an adequate amount of tissue is submitted, the pathologist should be able to identify the tissue source and provide an accurate interpretation. While in some cases that assumption is correct, failure to indicate the sample source or providing incomplete information about the source may result in several problems.

First, the pathologist may be hesitant to interpret the sample findings without knowing the precise origin, which may lead to unnecessary delays while the laboratory or pathologist attempts to contact the practitioner to obtain this additional information.

Second, an incorrect or speculative diagnosis may result. For example, considerable overlap exists in the cytologic appearance of certain tumors that arise in various tissues and organs. Thus, the pathologist may be forced to speculate or simply provide a list of possibilities that may correlate with the microscopic findings.

A related problem occurs when samples are submitted with only a notation that a mass is present and without an appropriate description of the lesion. An adequate gross description of the lesion, such as a “rapidly growing, 3-cm firm mass in the skin over the right thigh attached to underlying tissue” instead of “skin mass,” helps the pathologist accurately interpret cytologic and histologic findings.

Another important part of submis-
NOW, WHEN A PATIENT’S SKIN BARRIER BREAKS DOWN, YOU CAN HELP REBUILD IT WITH JUST A FEW DROPS.

ALLERDERM® Spot-On helps damaged skin repair and restore itself. It’s a breakthrough for patients with compromised skin based on the new “outside-inside” theory. With a Skin Lipid Complex that’s almost identical to lipids found in healthy pet skin, ALLERDERM Spot-On is an epidermal barrier restoration aid for both dogs and cats suffering from skin disease.

Just a few drops from the small, easy-to-handle applicator can help to rebuild a damaged skin barrier. It’s the ideal adjunctive therapy for all of your patients with compromised skin.

View a scientific presentation by Douglas J. DeBoer, DVM, DACVD on the “outside-inside” theory, and see the new findings for yourself, at www.virbacvet.com/AllerdermSpotOn.

*Data on file.
section is to properly label all slides and containers with the patient name and sample source or tissue of origin. For cytologic specimens, slides with a frosted edge are ideal, as this area can easily be labeled with a pencil. Labeling slides with a marker or attaching tape labels is discouraged. Tape labels may need to be removed for slide processing, and marker ink often dissolves during fixation and staining. Improperly labeled slides or containers can result in sample misidentification or unnecessary delays. All pertinent patient information and clinical and diagnostic findings should be included on the submission form.

Unfortunately, lawsuits in veterinary medicine occur, and a pathology report may play an integral role in the case management or outcome. If a sample was submitted improperly or requested information was not provided (history, sample source, or both), a potential liability exists. Proper sample submission is a simple task that increases the likelihood of receiving satisfactory results and protects the practitioner.

For example, a sample containing numerous small lymphocytes may be interpreted differently in the absence of an appropriate history and source. If the sample was obtained from a marginally increased popliteal lymph node, the findings might reflect a normal or slightly hyperplastic population. However, if the sample was obtained from a 6-cm lymph node, small cell lymphoma might be considered more likely. Another common example is a sample containing small numbers of spindle cells. If the sample was obtained from a small lesion of chronic duration, the cells might reflect traumatic injury with fibrosis or granulation tissue or both. If the sample was obtained from a baseball-sized mass, the pathologist is more likely to consider a mesenchymal tumor.

**SHOULD I LOOK AT SLIDES BEFORE SUBMITTING?**

Nondiagnostic cytology samples are commonly submitted for evaluation. This complication can delay patient treatment or prevent the practitioner from moving forward with additional diagnostics or procedures. Client frustration can occur over the cost of the test and time spent awaiting results, even if forewarned the procedure may be inconclusive.

When surgical biopsy samples are being submitted, practitioners are somewhat limited in assessing the sample quality. However, when samples are sent for cytologic evaluation, practitioners should stain at least one slide and examine it on low magnification (10X objective) to avoid submitting nondiagnostic samples.

Common reasons for cytology samples being deemed nondiagnostic are marked blood contamination, a large number of ruptured cells (**Figure 1**), and low cellularity. Practitioners can often recognize these problems on low magnification and obtain another sample of the lesion. If further evaluation of sample quality is necessary, a temporary coverslip (without adhesive) can be placed on the slide followed by examination with the 40X objective.

Another potential problem that can result in a nondiagnostic sample is submission of slides that are understained or not properly fixed, which can make interpretation difficult or impossible. Slides that are not fixed adequately often cannot be restained and lack nuclear detail. For rapid Romanowsky-type stains (e.g. Diff-Quik—Dade Behring, Hema-Diff—Statlab), the recommended protocol for each product can be used as a general guideline. However, the time required for proper fixation and staining depends on the thickness of the preparation. In general, more time is required for highly cellular or proteinaceous specimens, such as liver aspirations or synovial fluid.

Well-stained nucleated cells should have dark-pink to purple nuclear chromatin, whereas nuclei from poorly stained cells may appear very pale blue or light pink. While understained slides can undergo additional staining at the laboratory, this may be of limited use for samples previously evaluated on oil magnification (100X objective). Immersion oil can interfere with additional staining, potentially rendering the sample nondiagnostic.

For specimens submitted for cytologic examination, submit multiple slides per site (three or four is generally sufficient), which may include stained and unstained specimens. Submitting only one or two slides, particularly if these have been previously stained, may limit cytologic evaluation depending on the sample quality.

**IF THERE IS A DISCREPANCY OR PROBLEM, SHOULD I CONTACT THE PATHOLOGIST?**

Contacting the pathologist is recommended if a practitioner has concerns about a pathology report (e.g. has questions about the diagnosis, prefers clarification of an interpretation, or needs help with narrowing the differential diagnoses) or the

---

**Figure 1** A lymph node aspirate from a dog containing numerous bare nuclei from ruptured cells, with abundant purple, streaming nuclear material in the background (Wright’s stain, 20X objective). (Photo courtesy of Dr. Rebecca Urbiztondo.)
A PATHOLOGIST?
Practitioners may be apprehensive about contacting pathologists. One concern is that pathologists are too busy to discuss a particular case. However, inquiries from practitioners are relatively common, and pathologists typically correspond with practitioners in a timely manner. Another concern is that practitioners may think pathologists perceive questions as a challenge to their interpretation. Pathologists are generally receptive to discussing their interpretation, other possible differential diagnoses, and any additional test results that may strengthen the confidence in the diagnosis.

Conversely, pathologists may contact practitioners about a challenging case or if they identify a potential problem. Pathologists may also seek additional information to solidify a diagnosis or narrow their list of differential diagnoses.

Practitioners and pathologists benefit from a good working relationship established through proper communication and cooperation when challenging cases arise.

DO I NEED A SECOND OPINION?
Obtaining a second opinion is an option when a practitioner has concerns about a pathology report. However, before this option is elected, it is important to determine if the pathologist was provided an appropriate patient history, a sample source, and pertinent clinical findings. Contacting the pathologist before requesting a second opinion may resolve a case issue and alleviate concerns. Furthermore, the practitioner may find that the pathologist obtained a second opinion before completing the report, which is fairly common when dealing with challenging cases.

Another important factor to consider is why a second opinion is needed. If the interpretation does not correlate with the clinical findings, requesting a second opinion is reasonable. But when pathologists express concern that a sample is poorly representative of a lesion, obtaining a second opinion is unlikely to provide much additional information or result in a definitive diagnosis. For example, obtaining representative tissue samples can be particularly challenging with lesions involving bone or masses arising within the oral cavity (e.g., gingival or odontogenic tumors). It is not uncommon for core biopsies of bone masses to predominantly contain secondary reactive bone, with no clear evidence of the primary underlying lesion. With these types of cases, additional sample collection may be necessary to obtain a diagnosis.

COMMENTS AND RECOMMENDATIONS
Pathology reports often include a section containing comments about the case. Depending on the sample and information provided by the practitioner, the comments may be case-specific or relatively generic. In the absence of key information, when the sample quality is not ideal, or when faced with complicated cases, the pathologist may be hesitant to provide a definitive diagnosis or express a high degree of confidence in his or her interpretation. In these cases, it is common for the practitioner to receive a list of differential diagnoses and recommendations for other tests or procedures (e.g., histologic examination, special stains, serology, culture, molecular assays, or collection of additional tissue samples).

AVOID THESE COMMON PROBLEMS
Below are several tips that may be useful in preventing common sample submission and interpretation problems.

Problem: Poor tissue exfoliation or low cellularity cytology samples
Avoid using small syringes (1 ml or 3 ml) and select a 20- to 25-ga needle. A 22-ga needle with a 5-ml or 6-ml syringe seems to work well in most situations.

Practitioners and pathologists benefit from a good working relationship when challenging cases arise.

Certain lesions may exfoliate poorly regardless of the technique used (e.g., mesenchymal neoplasms). Aspirates from lipomas are often of low cellularity when lipid material is lost from the slide during routine processing.

Aspiration of fluctuant areas of a mass can also be problematic, as many different lesions can be cystic. Cells from the cyst wall may not exfoliate in significant numbers into the fluid, and evaluation of fluid alone is unlikely to be diagnostic. A fluctuant or cystic area could also be due to tissue necrosis or secondary inflammation that might not be representative of the lesion. Consequently, aspiration or biopsy of the lesion wall (more solid area) is recommended.
Problem: Blood contamination of cytology samples
Some practitioners prefer to collect cytology samples by using an aspiration technique (e.g., 22-ga needle attached to a 5-ml syringe). For this method, the needle should be inserted into the mass or tissue and the plunger rapidly withdrawn once to develop negative pressure. Excessive withdrawal of the plunger will not result in a better sample but will increase the likelihood of blood contamination and cell rupture. This negative pressure is maintained while the needle is partially withdrawn and carefully redirected into several areas for aspiration. Redirection should be done carefully to avoid excessive tissue trauma and bleeding. The negative pressure is then gently released before fully removing the needle, to avoid loss of cells into the syringe. After removal, the needle is detached from the syringe, and air is drawn into the barrel. The needle is then reattached to the syringe, and the sample is expelled onto the slide. The sample is then prepared for staining using techniques discussed in the next section.

A sewing machine, or woodpecker, technique, which uses only the needle hub without syringe aspiration, is an excellent alternative to the aspiration technique described above. The needle is placed into the lesion followed by a controlled sewing machine motion for cell collection. The needle may be partially or fully withdrawn and redirected to sample additional areas of the lesion. The needle is then attached to an air-filled syringe, and the sample is expelled onto a slide for further preparation.

Keep in mind that certain lesions such as hemangiomas, hemangiosarcomas, thyroid tumors, and mast cell tumors are frequently associated with marked blood contamination because of the intrinsic vascular nature of the lesion.

Problem: Poor cell preservation of cytology samples
Several excellent veterinary textbooks address collection and preparation of cytologic specimens in detail (see the suggested reading list below). Additionally, taking the following steps will increase the likelihood of obtaining a high-quality specimen by maintaining cell preservation.

1. Avoid using small-gauge needles (< 25 ga), as cells may be destroyed during aspiration or when they are expelled from the needle onto the slide. (Note: Some pathologists discourage use of 25-ga needles, whereas others think these are acceptable for obtaining diagnostic samples).

   Once material is expelled onto the slide, it should promptly be prepared for staining. This is important to avoid thick or clotted specimens, which are often nondiagnostic (Figure 2). A popular slide preparation technique is the squash prep, or slide-over-slide, technique (see the boxed text on page 138). The sample is expelled onto a clean slide near one end, preferably toward the frosted edge. A second slide is gently placed flat onto the sample at a right angle, forming a cross-shape when viewed from above. A smooth horizontal motion is used to spread the material along the slide. It is important to note that the weight of the spreader slide is sufficient for this technique, and that any additional digital pressure on the slides will increase the likelihood of cell rupture.

   Slides can also be prepared for staining by using the same technique used for blood smears. The blood smear technique is often useful for cystic or fluctuant lesions or body cavity effusions.

   Yet another option for slide preparation is the starfish technique. This technique is performed by carefully dragging a needle through the sample to create multiple thin strips of material radiating away from the center. The starfish technique can be particularly useful if cell rupture is a recurring problem when using the squash prep technique.

   If impression smears are being made (e.g., from a surgical biopsy), it is often useful to lightly blot the tissue sample with gauze or absorbent paper to remove excess blood. The surface of interest is then lightly touched to the slide several times, creating a row of imprints. Excessive force or smearing of the tissue should be avoided to minimize cell rupture.

2. Do not place unstained slides in a refrigerator or freezer, and always allow slides to air-dry before placing them in containers or bags for shipping. A hairdryer can be used to expedite this process, but the slides should be monitored to avoid prolonged exposure to heat. Unstained slides that are refrigerated or are packed for shipping before fully drying may have an artifact that severely distorts the cells.

3. Never allow specimens collected for cytologic evaluation to come into contact with formalin or for-
3. A splenic aspirate from a dog. This slide was exposed to formalin, resulting in severe artifact. Note the dark-blue discoloration (Wright’s stain, 10X objective). (Photo courtesy of Dr. Rebeccah Urbiztondo.)

4. A lymph node aspirate from a dog. This slide was properly prepared and stained. Several mast cells are present with considerable variation in size, nuclear:cytoplasmic ratio, and degree of granulation. This sample was diagnostic for metastatic mast cell neoplasia (Wright’s stain, 100X objective). (Photo courtesy of Dr. Rebeccah Urbiztondo.)

malin fumes. Such contact also results in severe artifact and often renders the sample nondiagnostic (Figure 3). This is a potential complication when unstained slides and biopsy samples are shipped in the same package.

4. Be particularly careful with lymph node aspirates, one of the most common samples affected by poor cell preservation because of the fragility of the cells. The sewing machine technique is often successful in obtaining high-quality samples from lymph nodes (Figure 4). If multiple lymph nodes are enlarged, the practitioner should aspirate several nodes to increase the likelihood of obtaining diagnostic samples. Each slide should then be properly labeled to indicate which lymph node was sampled. Some laboratories consider multiple lymph nodes as a single site and will charge accordingly, although the practitioner should verify the policy of the laboratory before submission to avoid unexpected charges for additional sites.

Problem: Inconclusive histologic findings or unsatisfactory results
Collect as large a sample as possible (within reason) to increase the likelihood of obtaining representative tissue sections. Collect multiple samples if necessary, particularly if there appear to be large areas of hemorrhage or necrosis.

It is important that a sufficient amount of formalin is used for the size of the sample and container. At a minimum, a ratio of 10:1 of 10% neutral-buffered formalin-to-tissue volume should be used, though some pathologists recommend a 20:1 ratio. The rate of formalin penetration and fixation reduces dramatically with increasing thickness of tissue, and unfixed tissue will undergo autolysis, which will impair or prevent diagnostic interpretation. So practitioners need to be aware of the thickness guidelines and adhere to them whenever possible. This holds particularly true for vascular, often congested tissues such as the spleen, liver, and kidney.

Sample sizes 0.5 to 1 cm thick are ideal for optimum fixation and should be provided for representative lesions in which complete excision is not achieved or is impractical. For larger submitted specimens, incision into the tissue may be necessary to allow the formalin to completely penetrate the tissue (e.g. splenectomy with a mass lesion). For very small specimens, submission of the sample in a tissue cassette is recommended, with sponges used for specimens smaller than cassette grate size.

For excisional mass lesions when border evaluation is necessary (e.g. mast cell tumors, soft tissue sarcomas), the specimen should be submitted in full. Designate borders appropriately (e.g. ink, sutures), and provide an explanation to orient the technician or pathologist for tissue sectioning. For example, write, “Two sutures are placed at the cranial border, and one suture is placed at the caudal border.” Aside from ink labeling or placing suture for orientation, the borders of the specimen should not be dissected or incised.

For endoscopic biopsies, samples should be numerous (eight to 10 per location) to offer the best opportunity
for evaluation of full-thickness mucosa and submucosa. Samples of only superficial mucosa are less diagnostic.

Use care when collecting and handling tissues to avoid crush artifact. This complication is common with skin biopsies. The interface of lesions and normal tissue is important for the pathologist in general, but particularly with skin samples. Such interfaces should always be included with skin biopsies. If skin lesions are large or multifocal, multiple biopsies are recommended to help ensure that the samples are representative. Avoid sampling of only ulcerated areas, as an intact epidermis is often critical to a diagnosis. Traumatic removal of surface crusts should be avoided; any crusted debris removed should be included in the submission.

The tissues should be submitted in jars or containers labeled with patient name and tissue source. When specimens from multiple sites are collected, each container should be labeled individually with patient name and source. Tissues to be submitted for histologic examination should never be frozen, unless specifically requested by the laboratory or pathologist for special testing. As always, provide patient history and information or results pertinent to the case on the submission form.

CONCLUSION
Proper sample submission and better communication between practitioners and pathologists will increase the likelihood of a positive outcome. This will enhance patient care, improve client satisfaction, and reduce the chance of complications.

SUGGESTED READING

ACKNOWLEDGMENTS
The authors would like to thank the following individuals for their insight and contributions:

MedVet Medical and Cancer Center for Pets, Worthington, Ohio: Lisa Fulton, DVM, DACVIM (oncology); and Eric R. Schertel, DVM, PhD, DACVS

Charles River Laboratories, Department of Pathology, Reno, Nevada: David V. Calise, DVM, MS, DACVP (anatomic pathology); and Angela Wilcox, BVSc, MS, DACVP (clinical pathology)

Texas A&M College of Veterinary Medicine, Department of Pathobiology, College Station, Texas: Mark C. Johnson, DVM, DACVP (clinical pathology)

IDEXX Laboratories, Inc.: Stephanie Corn, DVM, DACVP (clinical pathology); Worthington, Ohio; Dean Cornwell, DVM, PhD, MT, Dallas, Texas; and Rick L. Cowell, DVM, MS, MRCPVS, DACVP (clinical pathology); Stillwater, Okla.
Kevin Fitzgerald, PhD, DVM, DABVP

**A Privilege to Practice: Puppies, Penguins, and Polar Bears (and Everything In Between)**

Thursday, May 5 / 7:45-9 a.m.

What do you give a Great Dane with diarrhea? “A lot of room,” says Dr. Kevin Fitzgerald, PhD, DVM, DABVP.

Dr. Fitzgerald, who has been featured on Animal Planet’s *Emergency Vets* and *E-Vet Interns*, practices at VCA Alameda East Veterinary Hospital in Denver. He will bring humor, inspiration, and a healthy dose of wildlife to CVC D.C. in May 2011 with his CVC Power Hour, “A Privilege to Practice: Puppies, Penguins, and Polar Bears (and Everything In Between).”

“In early 2010, *Psychology Today* listed people’s 10 most ideal dream jobs, and almost 85% of them involved working with animals,” Dr. Fitzgerald says. “I think the message is that what we do is a gift.”

With his collection of animal videos that includes radiotransmitting rattlesnakes, polar bears from Churchill in Manitoba, Canada, and even an Antarctic expedition, Dr. Fitzgerald will share the moments that have inspired him in this profession.

“Veterinary medicine is a harsh mistress, and it asks a lot of us, but the rewards are immeasurable,” he says. A veterinarian by day and a stand-up comedian by night, Dr. Fitzgerald also plans to discuss the future of the profession and some of its greatest rewards, including the opportunity to learn about different species and protect the health of animals and people.

“This is an exciting time for veterinarians, with emerging viruses and emerging zoonoses,” he says. “And I think veterinarians will become more and more influential in solving some of the problems with emerging diseases.”

One of the best parts of practice, Dr. Fitzgerald says, is that it offers a chance to work with animal lovers. “We work with people who want to help animals,” he says. “We’re drawing from a group of people with big hearts.”

Scott Shaw, DVM, DACVECC

**10 Things I Learned the Hard Way While Practicing Emergency Medicine**

Saturday, May 7 / 4-5 pm

You don’t want to miss this intense hour of insight from a veterinary emergency and critical care specialist. Emergency expert, Scott Shaw, will share his top-ten valuable lessons learned to help prevent you from making the same critical mistakes.

Gary Norsworthy, DVM, DABVP

**Chronic Vomiting and Diarrhea in Cats: It’s Really Not Hairballs or Worms**

Friday, May 6 / 3:15 - 4:15 p.m.

Stumped about what’s ailing your feline patients? Get the information you need to diagnose and treat cats that are experiencing chronic vomiting and diarrhea. Clinical signs aren’t always what they appear to be. Attend this practical CVC Power Hour to get pointers for better patient outcomes from an expert who lives and breathes cats.
Recognizing and treating immune-mediated polyarthritis in dogs

This inflammatory joint condition presents in many forms, often causing systemic illness and sometimes causing cartilage and bone destruction. Learn to distinguish these forms and what treatments induce remission and alleviate pain.

Caroline M. Kiss, DVM, DABVP (canine and feline practice), and Gregory C. Troy, DVM, MS, DACVIM

Immune-mediated polyarthritis (IMPA) represents a group of diseases that cause marked joint pathology and systemic illness. IMPA is defined as an inflammatory process that affects the synovium of two or more joints, has no identifiable infectious component, and is responsive to immunosuppressive therapy. Early recognition, diagnosis, and treatment are essential in reducing morbidity and mortality associated with the disease. Classifying IMPA will help you determine treatment and prognosis and is based on clinical, radiographic, pathologic, and serologic findings (Table 1).

Classification of Immune-mediated Polyarthritis in Dogs*

<table>
<thead>
<tr>
<th>Classification</th>
<th>Nonerosive IMPA</th>
<th>Erosive IMPA</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Idiopathic</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Type I: No association with other disease process</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Type II: Associated with infection or chronic inflammation that is remote from the joints</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Type III: Associated with gastrointestinal or hepatic disease</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Type IV: Associated with neoplasia remote from the joints</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Systemic lupus erythematosus polyarthritis</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Polyarthritis-meningitis syndrome</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Polyarthritis-myositis syndrome</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Drug-induced polyarthritis</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Vaccine-associated polyarthritis</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Breed-specific polyarthritis</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Polyarthritis in Akitas</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Shar-Pei fever</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Idiopathic erosive arthritis</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Polyarthritis in greyhounds</td>
<td></td>
</tr>
</tbody>
</table>

*Sources: References 1, 4, and 5.

OVERVIEW OF THE NONEROSIVE FORMS

Although several retrospective studies have suggested the susceptibility of certain breeds and sizes of dogs to nonerosive IMPA, inconsistencies among reports exist. Thus, nonerosive IMPA may occur in any breed or size of dog. It occurs at a mean age of 4 to 6 years with no definite sex predilection.

Most dogs present with a stiff, stilted, or “walking on eggs” gait; lameness; reluctance or inability to stand; and joint pain and effusion. Commonly affected joints include the carpus, tarsus, stifle, and elbow; bilaterally symmetric...
joint involvement is frequent.5,7,9 Spinal pain may also occur because of intervertebral joint inflammation.10

Systemic signs include anorexia, weight loss, fever, lethargy, and lymphadenopathy.1,2,4,5,7,9 Up to 25% of dogs present with subtle or no signs of gastrointestinal abnormality, lameness, joint effusion, or joint pain but have systemic signs of illness.5,11-13 IMPA should be considered as an underlying cause of fever of unknown origin; it accounted for 20% of dogs presenting with a fever of unknown origin in one study population.14

Idiopathic nonerosive polyarthritis

Idiopathic nonerosive polyarthritis is the most common form of IMPA and represents 58% to 83% of all reported cases of IMPA.1,5,8,9 Idiopathic nonerosive polyarthritis has been classified into four subtypes depending on the presence of distant infection, gastrointestinal disease, or neoplasia (Table 2). The relevance of associated disease in canine IMPA is unknown, but similar associations are recognized in people and are thought to have pathogenic significance by acting as a trigger for IMPA.15 Idiopathic types II, III, and IV are also referred to as reactive IMPA by some authors.2,8

Idiopathic type I IMPA is not associated with distant disease and accounts for most idiopathic nonerosive IMPA cases reported in dogs.5,7,8,15 Idiopathic type II IMPA is associated with infectious or chronic inflammatory disease and has been reported with pyoderma, urinary tract infection, pneumonia, endocarditis, mastitis, dirofilariasis, fungal infection, pleuritis, and severe periodontal disease.1,5,8,15 Idiopathic type III IMPA is associated with chronic gastrointestinal disease and has been reported with inflammatory bowel disease, intestinal malabsorption, bacterial overgrowth, and ulcerative colitis.1,5,8,15 Idiopathic type IV IMPA is associated with distant neoplasia and has been reported with squamous cell carcinoma, mammary adenocarcinoma, leiomyoma, heart base tumor, and seminoma.1,5,8,15

Treating idiopathic type I IMPA involves administering immunosuppressive, immunomodulating, and disease-modifying agents, while treating idiopathic types II, III, and IV focuses on resolving the underlying disease process. The prognosis of idiopathic type I IMPA is good to guarded, while idiopathic types II through IV have a variable prognosis depending on the treatability of concurrent disease.1,5,7,8,15

The pathophysiology of IMPA

The basic immunopathologic mechanism of erosive and nonerosive forms of IMPA is similar. A type III hypersensitivity reaction occurs in which immune complexes deposit within the synovium, activate complement and inflammatory cascades, and result in chronic synovitis.1-5

A type IV hypersensitivity reaction is also involved in erosive IMPA.1-5 Mononuclear cells, predominantly lymphocytes and plasma cells, infiltrate the synovium, and an inflammatory fibrovascular proliferation—pannus—develops that releases cytokines and proteases.3,5 Pannus extends across and beneath articular cartilage and destroys cartilage and subchondral bone.1,3-5

A combination of genetics and stimuli is thought to take part in initiating IMPA.5 Genetics may increase susceptibility to all forms of IMPA and plays a more obvious role in breed-specific forms. Stimuli including bacteria, medications, and systemic inflammation may trigger polyarthritis by providing an antigenic source for immune complex formation in susceptible animals.5,6

An epitope on a major histocompatibility antigen has been associated with the development of idiopathic erosive IMPA in dogs.1,5,7,8

REFERENCES

positive serologic test results or two major signs and negative serologic test results (Table 2). SLE polyarthritis has a similar presentation to other nonerosive forms of IMPA and reportedly accounts for 8% to 20% of canine IMPA cases. The treatment of SLE polyarthritis is similar to the treatment of idiopathic forms and requires administering immunosuppressive and immunomodulating medications. If other organ systems are involved, treatment must also address other clinical signs. Remission is attainable with treatment and may also occur spontaneously.

The prognosis of SLE is variable, and concurrent organ dysfunction is often responsible for death or euthanasia.

**Polyarthritis-meningitis syndrome**

A syndrome in which steroid-responsive meningitis arteritis (SRMA) occurs with polyarthritis has been described. It was first seen in Bernese Mountain dogs, Weimaraners, and German shorthaired pointers but has since been documented in many breeds. In one study, 29% of dogs with IMPA had associated spinal pain, and, of those, nearly 50% were confirmed to have concurrent SRMA by cerebrospinal fluid (CSF) analysis. Dogs with polyarthritis-meningitis syndrome are suspected to have spinal pain due to a combination of meningeal and intervertebral joint inflammation. Polyarthritis-meningitis syndrome occurs in young, male, medium- to large-breed dogs, and clinical signs include lethargy, reluctance to walk, and cervical pain, particularly on flexion and extension of the neck. Effusion involving appendicular joints may not be obvious.

The treatment of SRMA and IMPA is similar, but the syndrome is important to recognize since recurrence or neurologic damage may occur if it is treated inappropriately. Most dogs with SRMA respond to immunosuppressive therapy with a good to guarded prognosis. It is not known whether dogs with both IMPA and SRMA have a different prognosis than dogs with SRMA alone.

**Polyarthritis-polymyositis syndrome**

Polymyositis has been described as a manifestation of canine SLE, but a nonlupoid syndrome of polyarthritis and polymyositis has been described. The syndrome occurs most commonly in young to middle-aged spaniel breeds. Dogs present with waxing and waning stiffness, joint effusion, myalgia, muscle contracture, and progressive bilaterally symmetric muscle atrophy. Treatment is similar to that of idiopathic IMPA, but the presence of concurrent muscle involvement worsens the prognosis, and response to treatment is variable.

**Drug-induced polyarthritis**

IMPA has been associated with the administration of a variety of medications, including sulfonamides, lincomycin, erythromycin, cephalosporins, phenobarbital, and penicillins. Sulfonamides, including sulfadiazine, sulfamethoxazole, and sulfadimethoxine, are most commonly implicated. Polyarthritis induced by sulfonamides is most notable in Doberman pinchers and other large breeds and occurs at recommended drug dosages. Signs of polyarthritis occur, on average, five to 20 days after drug exposure. With previous exposure, signs may occur more rapidly. Clinical signs are typical of IMPA (e.g., lameness, swollen and painful joints, fever, and lymphadenopathy) and may occur with concurrent hypersensitivity reactions including thrombocytopenia, hepatopathy, neutropenia, keratoconjunctivitis sicca, hemolysis,
uveitis, or skin and mucosal lesions.1,2
Treatment involves discontinuing the drug; improvement in polyarthritis generally occurs within 24 hours.1,2 Complete recovery generally occurs within two to five days of drug withdrawal. Some cases require immunosuppressive therapy for quicker and more complete resolution of clinical signs. The reported prognosis is generally good.

**Vaccine-associated polyarthritis**
Vaccines have been implicated as an inciting event for IMPA but such cases are poorly documented within the veterinary literature.1,2,15 In reported cases, IMPA caused by vaccines occurred within 30 days of vaccination. A true cause-and-effect relationship is difficult to prove, and little is known about a potential pathophysiologic mechanism. Canine distemper antigens have been found in immune complexes from joints of dogs with erosive IMHA and may suggest vaccine involvement.16 Most vaccine-associated IMPA cases are self-limiting and may require a short course of immunosuppressive treatment.

**Breed-specific polyarthritis**
Breed-specific cases of nonerosive IMPA include syndromes observed in Akitas and Chinese Shar-Peis.
A rare, nonerosive polyarthritis affects adolescent Akitas and may occur concurrently with meningitis or other organ involvement.16,26 Affected dogs are treated with immunosuppressive agents, but response is generally poor.
Shar-Peis can experience a polyarthritis syndrome known as *Shar-Pei fever or swollen hock syndrome*.1,2,16 It is an autosomal recessive disease associated with elevated interleukin-6 production.1 The age of onset is variable, and the syndrome typically presents as cyclical episodes of fever and joint swelling of one or both hocks.1,2 Joint swelling may be due to effusion or periarticular swelling, and enthesopathies (abnormalities involving the tendon or ligament attachments to bone) may be present.1,2 Amyloidosis can be a component of the disease and occurs independent of fever and joint swelling.1,2

These cyclical episodes may require palliative treatment but can spontaneously resolve. Treatment of amyloidosis has been attempted with colchicine, but no studies have proved its efficacy.1,2 Prognosis is variable depending on the degree of amyloidosis, and renal or liver failure is often the cause of death.1,2

**Overview of the erosive forms**
As stated previously, two main erosive forms of IMPA exist—idiopathic and a polyarthritis that affects greyhounds.

**Idiopathic**
Idiopathic erosive IMHA occurs in all dog breeds but is most frequent in smaller breeds, with an average age of onset of 2 to 6 years and no sex predilection.6,16,27-30 Early in its course, dogs present with stiffness (especially after rest), intermittent lameness, and swelling of single or multiple joints.27-30 The carpal, tarsal, and phalangeal joints are most often affected, and bilaterally symmetric joint involvement is common.27,30 Clinical signs wax and wane over time, and lameness and stiffness may be accompanied by fever, lethargy, inappetence, and lymphadenopathy. The disease is progressive, but the rate of progression varies.27-30 Chronic disease results in connective tissue degeneration, including the joint capsule and intra-articular ligaments, which leads to further joint instability, causing subluxations and luxations.27-30

The treatment of erosive IMPA involves administering immunosuppressive, disease-modifying, or anti-inflammatory medications. Overall, lifelong therapy is needed, and response to treatment and long-term prognosis are poor.

**Erosive polyarthritis in greyhounds**
Erosive polyarthritis in greyhounds is a sporadic disease first reported in Australia in the 1970s.6,16,30,31 It has subsequently been recognized in the United Kingdom and United States. This disease affects young greyhounds between the ages of 3 to 30 months and has no sex predilection.6,16,30,31 Its clinical presentation is similar to that associated with idiopathic erosive polyarthritis in which distal joints are affected, but it appears to be a more slowly progressive disease, causes a nonsuppurative synovitis, and has less severe subchondral erosions than idiopathic erosive polyarthritis.6,16,30,31 Treatment is similar to idiopathic erosive IMPA, and response is variable.

**DIAGNOSIS OF IMPA**
The key in the diagnosis of IMPA is synovial fluid analysis; however, a comprehensive diagnostic evaluation should be performed to rule out infectious causes and identify associated disease. Diagnostics should include a complete blood count (CBC), serum chemistry profile, urinalysis, urine culture, rickettsial titers, thoracic and abdominal radiography, joint radiography, and synovial fluid analysis with bacterial culture. Other diagnostics to consider on a case-by-case basis include an abdominal ultrasonographic examination, an antinuclear antibody (ANA) test, a muscle biopsy, a synovial biopsy, or CSF analysis.

**Synovial fluid analysis with bacterial culture**
Clinical suspicion of polyarthritis, even in the absence of obvious joint effusion, should prompt you to perform arthrocentesis.1,2,6,16,19,30 Normal synovial fluid is relatively clear and viscous and does not clot on exposure to air (Figures 1 & 2).
Canine iMPA
❖

Peer-reviewed

The volume of fluid collected from normal joints is < 0.1 to 0.25 ml. Normal synovial fluid is relatively acellular, with a protein concentration < 2.5 g/dl and a nucleated cell count < 3,000 cells/µl. Mononuclear cells predominate.

In cases of erosive or nonerosive iMPA, joint fluid may be thin, turbid, and increased in volume. The protein concentration is usually > 2.5 g/dl, and nucleated cell counts are > 3,000 cells/µl, ranging from 4,000 to 300,000 cells/µl. Nondegenerate neutrophils typically account for most cells, but synovial fluid with greater than 12% nondegenerate neutrophils is still consistent with iMPA (Figures 3 & 4). Recent studies have shown that pleomorphic inflammation can be present with iMPA in which mononuclear cells account for 50% or more of the synovial cell count. This appears particularly true if a dog has been receiving immunosuppressive medications or has a waxing and waning form of disease.

The amount of synovial fluid collected from arthrocentesis is often small. If quantity limits analysis, determining cell counts and types is most important. This can be accomplished with a microscopic evaluation of one drop of synovial fluid on a slide. Greater than 2 cells/hpf is abnormal, and an estimate of cell count and type is enough to aid in diagnosis.

Varying amounts of synovial fluid and inflammation will be present in different joints, so sample multiple joints. Most commonly, arthrocentesis of the carpal, tarsal, and stifle joints is recommended. One study obtained a diagnosis of iMPA most readily from arthrocentesis of bilaterally symmetrical tarsal joints.

Bacterial infections should also be ruled out through aerobic and anaerobic bacterial culture of synovial fluid. Polyarticular joint infections are rare and occur through hematogenous spread of organisms and have been described with omphalophlebitis in neonates and bacterial endocarditis in mature animals. Degenerate neutrophils and bacteria in synovial fluid are diagnostic for a bacterial infection. However, synovial fluid from infected joints can also have a predominance of nondegenerate neutrophils and no obvious bacteria. A critical assessment of bacterial culture results with other clinical, physical, and diagnostic findings is essential, as only 50% to 70% of bacterial joint infections will have positive bacterial culture results.

CBC, serum chemistry profile, and urinalysis

CBC findings in patients with iMPA include a neutrophilic leukocytosis (24% to 69% of patients), leukopenia (8% to

1. Placing a drop of synovial fluid between fingers is one way to assess synovial fluid viscosity.

2. Collect joint fluid in a purple top (EDTA) tube for cytologic analysis and a red top tube for culture and sensitivity.

3. Cytologic examination of synovial fluid from a dog with iMPA demonstrating large numbers of nondegenerate neutrophils. Greater than 2 cells per high power field is elevated (500X, high power field).

4. Synovial fluid from an iMPA patient demonstrating nondegenerate neutrophils (1000X, oil immersion).
register now

to get the

intensive hands-on
training you need

VETERINARY MEDICINE® PRESENTS EXCLUSIVE WET LABS AND WORKSHOPS, FEATURING TWO BRAND NEW LABS ON CANINE AND FELINE SOFT TISSUE SURGICAL PROCEDURES AND DIAGNOSTIC PROCEDURES.

only at cvc

EXCLUSIVE!

Specialty Focus™: Abdominal Ultrasonography

EXCLUSIVE!

Specialty Focus™: Clinical Tools and Procedures in Feline Medicine

EXCLUSIVE!

Specialty Focus™: Orthopedics — Minimally Invasive Fracture Repair

Choose from 18 labs and workshops in areas ranging from dental techniques to ophthalmic surgery. Labs fill up fast, reserve your seat today!

USE PROMO CODE D11P04

Wet labs and workshops are open to all CVC attendees and require a separate registration fee. Lab participation requires at least a one-day CVC in Washington, D.C. registration for the SAME day in addition to the lab fee.
24% of patients), mild nonregenerative anemia (15% to 35% of patients), and mild thrombocytopenia (8% to 27% of patients). Other findings in patients with iMPA include an elevated alkaline phosphatase activity (10% to 60% of patients), hypoalbuminemia (7% to 27% of patients), and an elevated urine protein:creatinine ratio (7% to 30% of patients). Findings from a CBC such as a neutrophilic left shift, severe anemia, severe thrombocytopenia, evidence of hemolysis, or serum chemistry results consistent with renal or hepatic disease should prompt your suspicion of other infectious or multiorgan disease processes.

**ANA test**

Perform an ANA test in dogs with multiorgan disturbances. Most dogs with iMPA have negative ANA results, but a positive result should increase your suspicion of SLE. To help confirm a diagnosis of SLE, a lupus erythematosus cell preparation can be performed, but an ANA test is preferred because of increased sensitivity and availability through reference laboratories.

**Radiography**

Obtain joint radiographs to rule out other causes of lameness and joint pathology and to characterize iMPA as erosive or nonerosive (Figures 5-8). Radiographs typically demonstrate joint effusion and periarticular soft tissue swelling with iMPA. On occasion, joint effusion is not detected. In advanced cases of erosive iMPA, subchondral bone erosions, subluxations, luxations, or ankylosis is present. If you suspect erosive disease, obtain stressed medial, lateral, flexed, and extended radiographic views of the carpus and tarsus as they are useful in detecting joint instability. Early in the disease process, radiographs of both erosive and nonerosive iMPA may appear similar with no obvious erosion. Thus, later in the disease process, you may need to repeat radiographs to determine the true form of disease.

**Antigen and antibody tests**

Vector-borne infectious polyarthritis, particularly in disease-endemic areas, should be ruled out with appropriate antibody titers (initial and convalescent) and antigen detection methods (PCR, immunohistochemistry). Rickettsial organisms, including *Borrelia burgdorferi*, *Rickettsia rickettsii*, *Ehrlichia canis*, and *Anaplasma phagocytophilum*, and other vector-borne agents such as *Leishmania* species cause a polyarthritis that can be difficult to differentiate from iMPA. A recent study demonstrated a significantly
greater percentage of dogs with iMPA were seropositive for *B. burgdorferi* than dogs in the general hospital population and suggested that some cases of iMPA were due to Lyme disease. Because of difficulty in completely ruling out some vector-borne diseases, assessing response to an antibiotic trial may be warranted before initiating immunosuppressive therapy.

**Muscle and synovial biopsy, CSF analysis, and rheumatoid factor test**

Perform a muscle biopsy in cases of suspected polyarthritis-polymyositis syndrome. With this syndrome, muscle biopsy samples demonstrate inflammatory infiltrates, often focal, with varying degrees of atrophied muscle fibers and areas of necrosis. A synovial biopsy, while usually not indicated in patients with acute disease, can be useful in diagnosing erosive iMPA before radiographic changes are evident. With erosive iMPA, synovial biopsy samples demonstrate villous hypertrophy of the synovial membrane and extensive infiltration of mononuclear cells into the synovium. CSF analysis should be performed in cases of suspected polyarthritis-meningitis syndrome. In these cases, typical CSF findings are a normal to moderately elevated protein level and a neutrophilic or mixed leukocyte pleocytosis. A rheumatoid factor test is not a specific or sensitive test for diagnosing idiopathic erosive iMPA in dogs.

**TREATMENT**

Treatment of erosive and nonerosive iMPA involves treating joint inflammation and any identified, underlying immunologic trigger. Numerous treatment regimens have been proposed that involve single or multiple agents, including immunosuppressive drugs, immunomodulating drugs, or newer disease-modifying agents (defined by their ability to slow disease progression) (Table 3). A standard treatment of iMPA is difficult to identify, as controlled prospective clinical trials are unavailable. Regardless of the treatment regimen chosen, the goal is remission. If remission is not attained, the goals of treatment are to achieve the lowest possible level of joint inflammation, minimize joint damage, and enhance physical function and quality of life while minimizing drug toxicity. Monitor the patient regularly to ensure that these goals are being met and, if not, determine if an alternative course of therapy is necessary.

**Nonerosive**

Treatment of idiopathic types II through IV iMPA, drug-induced iMPA, and vaccine-associated iMPA relies on identifying and treating underlying causes. Failure to identify triggers will result in persistent or recurrent joint inflammation. Once the cause is addressed, most cases resolve on their own. Some may require additional treatment as discussed below. Other treatments may be indicated for SLE and Shar-Pei fever, as previously discussed.

**Other forms of iMPA**, including idiopathic type I iMPA, SLE polyarthritides, polyarthritis-meningitis syndrome, polyarthritis-myositis syndrome, and polyarthritis in Akitas, require

---

**TABLE 3**

<table>
<thead>
<tr>
<th>Medications Used in Treating IMPA (Induction Dosages)*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Azathioprine</td>
</tr>
<tr>
<td>2.2 mg/kg PO every 24 to 48 hours</td>
</tr>
<tr>
<td>Chlorambucil**</td>
</tr>
<tr>
<td>2 mg/m² or 0.2 mg/kg PO every 48 hours</td>
</tr>
<tr>
<td>Cyclophosphamide**</td>
</tr>
<tr>
<td>Dogs &lt; 15 kg: 2.5 mg/kg PO</td>
</tr>
<tr>
<td>Dogs 15–30 kg: 2 mg/kg PO</td>
</tr>
<tr>
<td>Dogs &gt; 30 kg: 1.5 mg/kg PO OR 50 mg/m² PO (all doses given four consecutive days of the week)</td>
</tr>
<tr>
<td>Cyclosporine</td>
</tr>
<tr>
<td>5 mg/kg PO once daily</td>
</tr>
<tr>
<td>Gold salt: Sodium aurothiomalate**</td>
</tr>
<tr>
<td>1 mg/kg IM once weekly for six weeks, repeated every two to three months as needed</td>
</tr>
<tr>
<td>Gold salt: Auranofin</td>
</tr>
<tr>
<td>0.05–0.2 mg/kg PO b.i.d., up to a maximum daily dose of 9 mg/day</td>
</tr>
<tr>
<td>Leflunomide</td>
</tr>
<tr>
<td>3–4 mg/kg PO once daily</td>
</tr>
<tr>
<td>Levamisole</td>
</tr>
<tr>
<td>2.2 mg/kg PO every 48 hours for two weeks, then twice weekly for three months OR 0.5–2 mg/kg three times weekly OR 2–5 mg/kg, maximum of 150 mg daily, every other day concurrent with prednisone at 1–2 mg/kg/day</td>
</tr>
<tr>
<td>Methotrexate</td>
</tr>
<tr>
<td>2.5 mg/m² PO every 48 hours</td>
</tr>
<tr>
<td>Prednisone</td>
</tr>
<tr>
<td>2–4 mg/kg PO daily</td>
</tr>
</tbody>
</table>

*Sources: References 1–4, 6, 18, 19, 35, and 36. All medications should be tapered to the lowest effective dose once remission is achieved.

**Dosage varies widely; not proven to be effective at inducing IMPA remission.

***Do not use for longer than four months.**
treatment with immunosuppressive, immunomodulating, and disease-modifying drugs.

**Immunosuppressants.** Corticosteroids are often the initial treatment of choice because of the low cost of treatment and rapid rate of action.\(^1\)\(^2\)\(^4\)\(^6\)\(^18\) About 80% of dogs with idiopathic type I IMPA respond to immunosuppressive doses of prednisone,\(^9\)\(^15\) but half of these dogs require long-term or combination drug therapy to maintain remission.\(^15\)\(^18\) Prednisone is initially administered at immunosuppressive doses of 2 to 4 mg/kg/day until remission is achieved (see **Monitoring section below**). Once remission is achieved, prednisone is then gradually reduced over an extended period, usually two to four months.\(^1\)\(^4\)\(^6\)\(^18\)

If clinical signs recur upon dose reduction or discontinuation, reinstitute prednisone at the initial dose or add another drug to therapy. If a patient needs to receive prednisone long-term to control clinical signs, use the lowest effective dose, preferably on an every-other-day dosing schedule. Side effects associated with long-term corticosteroid use include iatrogenic hyperadrenocorticism, diabetes mellitus, urinary tract infections, pyoderma, and breakdown of collagen in tendons and ligaments.\(^35\)

If prednisone monotherapy is ineffective, not tolerated, or not preferred, an additional cytotoxic drug is used adjunctively with prednisone. Azathioprine and cyclophosphamide are most commonly used with prednisone and have been shown to induce remission in patients with IMPA.\(^1\)\(^5\)\(^15\)\(^18\) The superiority of one drug over the other is unknown. Azathioprine is initiated at a dose of 2.2 mg/kg daily for two to four weeks and given concurrently with prednisone at an anti-inflammatory dose of 0.5 to 1 mg/kg every other day.\(^2\)\(^6\) After induction, azathioprine is then reduced to an every-other-day dose that alternates with prednisone.\(^2\)\(^6\) Cyclophosphamide is initiated at a dose of 1.5 mg/kg (for dogs > 30 kg), 2 mg/kg (for dogs 15 to 30 kg), or 2.5 mg/kg (for dogs < 15 kg) for the first four consecutive days of each week and given concurrently with prednisone at an anti-inflammatory dose once daily.\(^6\) Both treatment regimens are continued for two to four months, after which, if a patient is in remission, the azathioprine or cyclophosphamide is gradually withdrawn.\(^6\)

Side effects of azathioprine include bone marrow suppression and hepatotoxicity.\(^35\) Side effects of cyclophosphamide include bone marrow suppression and hemorrhagic cystitis.\(^35\) Because of the potential for hemorrhagic cystitis, cyclophosphamide should not be used for more than four months,\(^1\)\(^6\) and azathioprine may have the advantage of being better tolerated for long-term use. If a patient cannot be weaned from cyclophosphamide, chlorambucil may be substituted for maintenance therapy with fewer side effects.\(^6\)\(^29\) Chlorambucil has not been shown to be effective at inducing IMPA remission.

If a patient remains in remission once the cytotoxic agent is discontinued, a patient can be gradually weaned off prednisone. If remission is not attained with the addition of cyclophosphamide or azathioprine or is not maintained once the drugs are removed, levamisole, leflunomide, or cyclosporine may be added or substituted for the cytotoxic agent (Table 3).

**Immunomodulating drugs.** Levamisole, an anthelmintic with immunomodulating properties, has been shown to be effective in treating SLE polyarthritis\(^36\) and in relapsing cases of IMPA.\(^1\)\(^4\) In a study population of German shepherds affected with SLE and polyarthritis, levamisole induced remission in 76% of dogs.\(^36\) It is administered at a range of dosages but most commonly at 2.2 mg/kg every other day or 0.5 to 2 mg/kg three times weekly.\(^35\) To treat SLE, levamisole was administered at a dosage of 2 to 5 mg/kg (maximum of 150 mg/dog) every other day with a concurrent initial dosage of prednisone of 1 to
2 mg/kg/day. Side effects may include lethargy, vomiting, diarrhea, agitation, hemolytic anemia, and cutaneous drug eruption; these signs appear to occur most commonly at higher dosages.

Disease-modifying agents. Leflunomide has been recently evaluated for use in treating canine IMPA. The drug was used as monotherapy in dogs not receiving previous medication for polyarthritis and in those that relapsed while receiving prednisone. Ninety-three percent of dogs had a complete or partial response with treatment, and, of those responding, 63% had to continue to receive the drug long-term to maintain remission. Leflunomide was used at a dose of 3 to 4 mg/kg in this study and appeared to be safe and well-tolerated. Some authors recommend adjusting the leflunomide dose to a trough level of 20 µg/ml. It has not been investigated for use in combination with corticosteroids. Side effects include mild anemia, decreased appetite, and lethargy.

Cyclosporine has gained popularity for use in the treatment of a variety of immune-mediated conditions and may prove useful in treating IMPA. When used as a sole agent for treating IMPA, it was ineffective. Further investigation may find it efficacious as adjunct therapy. Side effects include gingival hyperplasia, gastrointestinal upset, or recrudescence of infectious disease.

Erosive

The use of many drugs in the treatment of erosive IMPA has been extrapolated from data in human patients, and a variety of different therapeutic protocols and agents have been suggested. Within veterinary medicine, little evidence exists regarding the superiority of one protocol over another, and no treatment has proved consistently effective in halting the progression of erosive IMPA in dogs. For best efficacy, treatment needs to begin early in the disease process, before marked joint damage. Drugs used to treat erosive IMPA include immunosuppressive, disease-modifying, or palliative medications.

Immunosuppressants. Immunosuppressive agents used to treat erosive IMPA in dogs include prednisone, azathioprine, cyclophosphamide, and chlorambucil. Using corticosteroids as monotherapy in dogs with erosive IMPA has a limited effect and is not recommended as it may promote cartilage damage. Administering prednisone in combination with azathioprine, cyclophosphamide, or chlorambucil has a variable benefit in slowing the progression of disease. Protocols for these agents are similar to those described above for nonerosive IMPA except that prednisone is initiated at higher immunosuppressive doses for several weeks to allow time for other agents to reach efficacy. Long-term therapy is generally required, and care must be taken to monitor for adverse effects.

Disease-modifying agents. Gold salts, hydroxychloroquine, penicillamine, methotrexate, and leflunomide are disease-modifying agents that have been used in veterinary medicine to treat erosive IMPA.

Gold salts, hydroxychloroquine, and penicillamine reportedly have had some therapeutic success in treating erosive IMHA but with variable efficacy. Objective data evaluating these drugs are limited, but the use of gold salts is reported most frequently.

Gold salts include an injectable formulation (sodium aurothiomalate) and an oral formulation (auranofin). They have been used most successfully in combination with anti-inflammatory doses of prednisone. Protocols vary, but sodium aurothiomalate is given at a dosage of 1 mg/kg intramuscularly once weekly for six weeks. Six week cycles are repeated every two to three months as a patient requires. Auranofin is given at a dosage of 0.05 to 0.2 mg/kg orally twice daily.

Side effects of gold salts include blood dyscrasias, diarrhea, ulceration of mucous membranes, erythema multiforme, hepatotoxicosis, and renal disease and may limit their use in some patients. Thus, close monitoring during therapy is critical.

Leflunomide and methotrexate have proven efficacious in treating a rheumatoid-like syndrome in cats. Neither drug has been evaluated for erosive IMPA in dogs, but some authors recommend their use in refractory cases.

Palliative therapy. Erosive IMPA is often diagnosed after severe joint disease has occurred and palliative therapy should be used to improve function and control pain. Palliative therapy includes administering NSAIDs and other pain medications such as opioids or tramadol. Additionally, physical therapy, surgical stabilization of joints, and the supplementation of glucosamine-chondroitin and omega-3 fatty acids may be beneficial.

MONITORING

Assess a patient’s response to therapy through its clinical signs and repeated synovial fluid analysis. Reducing or withdrawing drugs prematurely may result in exacerbating the clinical signs and make it more difficult to sustain a long-standing remission. Even in the absence of clinical signs, synovial inflam-
mation may persist. Ideally, arthrocentesis should be performed before each anticipated reduction in drug dose but is especially important before the first drug reduction. Repeated arthrocentesis should be performed on previously documented inflamed joints. No recommendation exists on the number of joints to reevaluate with synovial fluid analysis. Repeated arthrocentesis in a healthy dog does not appear to alter the type and numbers of cells in synovial fluid significantly. However, sequential arthrocentesis in a patient receiving immunosuppressive therapy is still a concern, and strict aseptic technique should be used.

C-reactive protein may be useful for monitoring IMPA remission. C-reactive protein is an acute phase protein that rapidly increases in the serum of patients in response to infection, inflammation, and tissue destruction. Several studies have demonstrated a linear relationship between the amount of C-reactive protein in serum and the amount of inflammation in synovial fluid in patients with IMPA. Because of these studies and the existence of reference values at major laboratories, C-reactive protein values can be used to monitor the induction and maintenance of remission in IMPA patients.

Patients also need to be monitored for potential adverse effects of medications used to treat IMPA. This monitoring may include performing CBCs, serum chemistry profiles, urinalyses, and urine bacterial cultures. Monitoring should begin within one or two weeks after initiating the drug and be continued at appropriate intervals thereafter. If adverse effects are noted, appropriate dose reductions should be made or the drug discontinued.

**SUMMARY**

Canine IMPA can be a challenging disease to diagnose and treat. Nonerosive IMPA predominates, with idiopathic type I accounting for most cases. Keys to diagnosis are recognizing the clinical signs, performing synovial fluid analysis, and ruling out other disease processes. The treatment of both nonerosive and erosive IMPA involves immunosuppressive, immunomodulating, and disease-modifying drugs. In dogs with nonerosive IMPA, the prognosis and response to treatment vary according to cause but is often guarded to good, with many patients responding to single agent or combination drug therapy. In dogs with erosive IMPA, treatment needs to be aggressive and lifelong, and efficacy is limited by the presence of marked joint damage before the initiation of treatment.

**REFERENCES**

Personalize your learning experience

Register to attend a premier CE convention, built by experts, focused on your professional goals.

only at cvc

❯❯ BRAND NEW! CVC Power Hours presented by leading experts

❯❯ BRAND NEW! Interactive Learning Zones from dvm360.com

❯❯ EXCLUSIVE seminars from the publications you know and trust

❯❯ EXCLUSIVE Wet Labs and Workshops from Veterinary Medicine®

REGISTER FOR THE 4-DAY VETERINARY PROGRAM AND SAVE OVER 20%
Early Bird pricing ends March 23, 2011
Mention Code C11P03

THECVC.COM 800-255-6864, ext. 6

LEARN. ENGAGE. GROW.
Dental Product for Dogs and Cats
Cleans teeth with the ease of a spray

Introducing LEBA III
Miles above The rest.

- High compliance, no brushing.
- 100% response in double blind tests.
- Used by veterinarians since 1994.
- Herbal solution causes no enamel damage and no side effects.
- Contains no chlorides, no Grapefruit Seed Extract.
- For pets who cannot tolerate anaesthesia.

1-866-532-2522 or (519)-542-3165
Website: www.lebalab.com Email: tellus@lebalab.com

BENCHMARKS 2010
Effective, purposeful leadership is critical for any business to succeed, prosper, and grow.

Benchmarks 2010: A Study of Well-Managed Practices sheds light on how some of the top veterinary practice owners lead their successful businesses even in times of financial turmoil. This study features practical data from 100 of the country’s most profitable companion animal practices along with strategies that guide you toward similar success.

$187.00

save on these and other educational resources at www.industrymatter.com | 800.598.6008
Immunosuppressants beyond glucocorticoids

Veterinary Medicine August 2010, Vol. 105, No. 8

Now, that’s smart.
For instant credibility, put a reprint into your prospect’s hands.
Have you been featured in Veterinary Medicine?

Frail perceptions of flea control failure occur. In a typical study, a single application of fipronil was 97.5% and 99.5% effective in eliminating established flea populations in treated dogs and cats, respectively. As good as the modern veterinarian-recommended treatments are, direct environmental controls may still be needed with severe flea infestations or during infestations during spring and fall. Urbanized environments, which can start the problem all over again, continually depositing flea eggs in the outdoor environment, which can start the problem all over again, and wildlife, move through the neighborhood and infest lawns and gardens. These flea-infested animals are summer and fall) or year-round. Then when fleas from surrounding areas and wildlife jump onto a treated pet, the pet is back in the infested premises. If we set our expectations high, we will be disappointed with what to expect once a flea product is administered. Pet owners should continue to treat their pets. Remind owners of the importance of understanding the limitations of study data analysis is important because while most products with residual efficacy can occasionally mask potential outliers. Unfortunately, data averaged from several homes and many treated pets for several weeks after product applications.

 selamectin, imidacloprid, and fipronil–(S)-methoprene spot-on formulations against fleas on cats. As good as the modern veterinarian-recommended treatments are, direct environmental controls may still be needed with severe flea infestations or during infestations during spring and fall. Urbanized environments, which can start the problem all over again, continually depositing flea eggs in the outdoor environment, which can start the problem all over again, and wildlife, move through the neighborhood and infest lawns and gardens. These flea-infested animals are summer and fall) or year-round. Then when fleas from surrounding areas and wildlife jump onto a treated pet, the pet is back in the infested premises. If we set our expectations high, we will be disappointed with what to expect once a flea product is administered. Pet owners should continue to treat their pets. Remind owners of the importance of understanding the limitations of study data analysis is important because while most products with residual efficacy can occasionally mask potential outliers. Unfortunately, data averaged from several homes and many treated pets for several weeks after product applications.

A bit of design advice

The tight space in airplanes became obvious to me on a recent flight. My wife, Debby, and I had aisle seats opposite each other. Three flight attendants served our cabin. I would describe one as ample. The other two cheerful, efficient mature ladies were more so. As they bustled about their tasks, carrying trash bags and energetically pushing their carts, they managed to bash both my right elbow and Debby’s left elbow. We quickly learned not to use the armrests on the aisle side and to keep that arm close to our sides. Despite this precaution, my arm got bashed by a powerful and fast-moving hip and my shirt was splattered with coffee. I solved this problem by using my left (or inside) hand to hold my cup.

Glancing down the aisle, I noticed that nearly all of the passengers had become aware of the risk posed by these two wide and vigorous attendants. Armrests on the aisle were no longer in use. So I say that the airlines need not only wider seats, but also wider aisles.

The obesity epidemic is a literal as well as a figurative problem. Theatres all over the country, at a cost of millions of dollars, are tearing out their seats and replacing them with wider models. The airlines, too, are installing wider seats in their crafts.

When furnishing the reception area, use benches. They are more widely versatile.

What’s this got to do with veterinary medicine? Plenty!

When I opened my first little 500-square-foot pet clinic in Thousand Oaks, Calif, a half century ago, we furnished the reception area in what was known as Early American décor. It featured a handsome fireplace mantel and two quaint benches, each of which accommodated four clients who usually had patients on their laps or at their feet on leashes.

A decade later, my partner, Dr. Bob Kind, and I moved our practice into a beautiful new hospital. It won the Veterinary Economics Hospital of the Year award.

The reception area received the same two Early American benches that had graced our earlier rented quarters. They are still in use today; however, although they once accommodated four early American clients, they no longer do. Today, they usually seat three current Americans.

So, the whole purpose of this column is to share with my colleagues a bit of useful information. When furnishing the reception area of an animal hospital, do not limit the seating to solitary chairs. In a few decades, they will become obsolete. Use benches. They are more widely versatile. ❖
Give Them Something Else To Chew...

DASUQUIN® Tasty Soft Chews

The #1 joint health supplement brand recommended by veterinarians

✔ Contains exclusive researched ingredients:
  - FCH649® Glucosamine (Glu), TRH122® Chondroitin Sulfate (CS), and
  - NMX1000® Avocado/Soybean Unsaponifiables (ASU)
  - which potentiates effects of Glu and CS
  - This combination is shown to work better in cartilage cells than Glu and CS

✔ Provides maximum joint health support beyond COX-2 inhibition:
  - Supports cartilage production
  - Protects against cartilage breakdown
  - Promotes joint comfort

✔ Soft chews have the same daily administration as Dasuquin chewable tablets

✔ Economical for long-term use

Visit Dasuquin.com for information, rebates, and promotions.

To order, call (888) 886-6442 or contact your authorized distributor.

Visit CECenter.com to earn 1 free CE credit (RACE-approved) by watching "Nutraceuticals in Practice" (under "Recent Courses") on Managing Canine and Feline Joint Health.

Also available as chewable tablets for dogs and sprinkle capsules for cats

Nutramax Laboratories, Inc.
2208 Lakeside Boulevard • Edgewood, MD 21040
nutramaxlabs.com • 1-800-925-5187
Give her
The KittenShot™
Fel-O-Vax Lv-K® III+CaliciVax™
for the best start in life

The KittenShot combines the power of two combos:

**Fel-O-Vax Lv-K®,** the number one feline leukemia vaccine, demonstrating 100 percent preventable fraction against persistent viremia in multiple published, peer-reviewed studies.1

**Fel-O-Vax®+CaliciVax™,** the unique dual-strain modern vaccine that has demonstrated virucidal activity against today’s emerging calicivirus strains in addition to a broad range of traditional strains.2

AAPF guidelines recommend feline leukemia vaccination for every kitten, in addition to the core antigens for all cats.3

The KittenShot brings them all together in a single safe, convenient combination to deliver proven protection other vaccines can’t match.

Contact your Boehringer Ingelheim Vetmedica, Inc. or distributor representative to order the KittenShot.

FEL-O-VAX LV-K III+CALICIVAX

---


