

Pacific Tide

An informational newsletter

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About our Author

Lillian Good, DVM, DACVECC

Dr. Good graduated from Cornell University with a Doctorate in Veterinary Medicine in 1999. Her internship in small animal medicine and surgery, at Angell Memorial Hospital in Boston, followed and was completed in 2000. She continued on at Angell Memorial for her residency training in emergency medicine and critical care (2000-2003), and joined our team upon completion. She became board certified in 2004.

Dr. Good finds the challenge of helping animals through critical medical emergencies to be extremely rewarding. She enjoys kayaking, paddle boarding and spending time with her son and dogs.



**Lillian Good,
DVM,
DACVECC**

Colloids

Colloid therapy plays a major role in the treatment of many critically ill veterinary patients. One may need to consider colloid treatment in many cases that are seen on a daily basis including those with hypovolemia, edema, hypotension, low albumin, blood loss anemia, and vascular compromise. It is therefore very important to have an understanding of the physiology behind protein dynamics in the body, as well as an awareness of colloid therapy choices.

The intact capillary endothelium is permeable to water and dissolved salts, but fairly impermeable to large molecules including plasma proteins. The fluid dynamics of the capillary system relating to filtration are governed by the Starling Law. Basically, this states that capillary fluid movement results due to the pressure differential of hydrostatic and oncotic forces between the capillary and interstitium. Oncotic Pressure is defined as the pressure exerted by plasma proteins across the capillary wall. With lower oncotic pressure fluid movement from the vascular compartment into the interstitium may be seen. This may result in undesirable edema in our critically ill patients. However, oncotic pressure is something that we are able to manipulate to our advantage in many instances.

Altered oncotic pressure is a frequent sequelae to significant illness. Because of this we see clinically relevant low oncotic pressure in many of our patients. Disease states with altered oncotic pressure can include:

- Post-operative
- Trauma
- Blood loss
- GI disease
- Liver disease
- Renal disease (protein-losing)
- Sepsis
- Systemic inflammatory diseases (SIRS)
- Neoplasia
- Coagulopathy
- Hypotension - anesthesia related and other

Therapeutic Intervention

Providing adequate hydration and replacing volume deficits is integral to optimizing recovery from illness. However, fluid overload and edema formation can be a risk which is associated with increased morbidity and mortality. As opposed to crystalloids, colloids can be more effective at restoring intravascular volume and improving blood flow; and therefore smaller volume resuscitation can be used in some instances. Colloid solutions contain large molecules that when used intravenously, increase the oncotic pressure in an individual. The result of which is that fluid will better be maintained within the vascular space, and potentially that fluid may be drawn in from the interstitial space into the vascular space. It is estimated that up to 80% of a crystalloid solution will move from the vascular space into the interstitium within 15-30 minutes of administration. Colloids, on the other hand may stay present in the vascular space for hours, which leads to more effective, prolonged volume expansion.

Therapeutic colloids can be broadly classified as natural or synthetic. The natural colloids include plasma, albumin, and whole blood. Synthetic colloids include tetrastarch (Vetstarch, Voluven), hetastarch (Hespan), dextrans, and oxygen based hemoglobin carriers (Oxyglobin). At PVSES, Vetstarch is currently the most frequently used synthetic colloid. It has a mean molecular weight of 130kD, which causes an immediate volume expansion, improvement in microcirculatory flow, and improved tissue oxygenation. It is reported to have fewer side effects than hetastarch, including low incidence of coagulopathy, fluid overload, and renal compromise. Recommended dosing ranges from 20-50mL/kg/day.

Natural colloids can have additional benefits beyond oncotic pressure support. Many drugs are protein bound, and low albumin may result in altered pharmacodynamics. Other proteins including coagulation factors, alpha-macroglobulins, and fibronectin may also be present in plasma solutions that may benefit certain patients in additional ways. Low albumin can also negatively impact vascular permeability overall.

Therefore, for the purposes of restoring or optimizing cardiovascular dynamics and tissue oxygenation, while aiming to limit excessive fluid administration, colloid therapy should be considered as a valuable clinical resource for many of our veterinary patients.

Our Doctors

Internal Medicine

Kelly Akol, DVM, DACVIM (SAIM)
Merrienne Burtch, DVM, DACVIM(SAIM)
Michelle Pressel, DVM, DACVIM (SAIM)

Surgery

Lisa Metelman, MS, DVM, DACVS
Tom LaHue, DVM, DACVS
Dean Filipowicz, MS, DVM, DACVS

Oncology

Theresa Arteaga, DVM, DACVIM(Oncology)

Critical Care

Colleen Brady, DVM, DACVECC
Lillian Good, DVM, DACVECC

Cardiology

Mandi Kleman, DVM, DACVIM(Cardiology)

Dermatology

Katherine Doerr, DVM, DACVD

Radiology (VRS)

Larry Kerr, DVM, DACVR
Mark Lee, DVM, DACVR

Emergency

Christian Robison, DVM
Kim Delkener, DVM
Mark Saphir, DVM
Jessica Kurek, DVM

Behavior

Jan Brennan, DVM (practice limited to behavior)

About Our Hospitals

Pacific Veterinary Specialists was founded to provide high quality, specialized medical care to companion animal patients. Our practice is dedicated to serving the veterinary community as a partner in total patient care. We offer comprehensive specialized services including endoscopy, Doppler ultrasound, surgery, 24-hour ICU care, and emergency and critical care. Our staff is committed to providing compassionate and thorough medical care that meets the needs of the patient, client, and referring veterinarian. In September 2011 we opened PVSM and offer internal medicine, oncology, dermatology and cardiology Tuesday through Thursday in Monterey. Behavior consultations by appointment are available on Mondays.

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