

"You are receiving this monthly SonoPath.com newsletter on hot sonographic pathology subjects that we see every day owing to your relationship with a trusted clinical sonography service. This service has a working relationship with SonoPath.com and sees value in enhancing diagnostic efficiency in veterinary medicine."

Brought to by:



Animal Sounds

JANUARY 2012
How To Get The Most Out
Of Your Ultrasound Consultation – 4 Pages

In order to properly launch 2012 I thought that an overview regarding getting the most information out of your sonograms in 2012 would be an appropriate subject to discuss. We, at SonoPath.com and our collaborators wish your health and prosperity in 2012 and hope you would consider joining us on line at SonoPath.com in the quest for enhancing diagnostic efficiency worldwide in veterinary medicine.

Light Sedation: Many of our patients don't *really* want to be at a veterinary hospital, don't feel well, and honestly may be a little cranky or nervous. They don't want to be there and we don't want to wrestle with them or stress them and we, as clinical sonographers, can do a more detailed sonogram if the patient will work with us during the imaging session. Talking the edge off with some light sedation such as domitor, opioids (Torbutrol and similar), using your favorite protocol, or here are some protocols from VIN resources for cardiac patients but are applicable for other compromised patients as well (see below). A timely injection before the expected ultrasound time frame works nicely to just take the edge off the patient without compromising the clinical status or our ability to perceive localized pain on imaging which is important for us to perceive during the scan. This procedure may also allow us to take minor samples without further sedation and will usually avoid having to tie up personnel for heavy restraint of difficult patients. This saves everyone time and renders the visit more efficient and pleasurable for all. You and your staff will likely be able to perform many procedures as well that you struggle to complete in these patients such as oral exams, ear exams, nail trims, detailed clinical exams and so forth.

Courtesy of VIN:

Feline Sedation protocols:

(A) 0.1 mg/kg acepromazine and 0.1 mg/kg hydromorphone SQ. Effect lasts approx 20-30 min (***Kittleson MD***)

(B) In a rare case of echoing 8-12 week old kittens I may use a small dose, 0.05-0.1 mg of medetomidine (***Tidholm A***)

(C) 0.05 mg/kg acepromazine and 0.05 mg/kg butorphanol tartrate both given SQ, wait 15 min for effect. (**Amberger C**)

(D) 0.05mg/kg acepromazine and 0.01mg/kg buprenorphine (Temgesic) SQ, wait 15 min for effect (**Amberger C**)

(E) 0.2-0.4 mg/kg midazolam and 0.1 mg/kg hydromorphone IM in the same syringe. (**Huston S**)

(F) 2-4 mg/Kg IV Ketamine and 0.4 mg/Kg IV Diazepam (**Braz-Ruivo, L**)

Canine Sedation protocols:

(A) 0.3 mg/kg Butorphanol and 0.3 mg/kg Valium IV. Don't mix them as you get a whitish precipitate. Place a butterfly needle, give valium first then flush with saline, then butorphanol. Effect lasts 20-30 mins.

(**Edwards J**)

(B) 0.005 mg/kg acepromazine and 0.01mg/kg buprenorphine IV. Effect lasts approx 20-30min. Useful in puppies. (**Rishniw M**)

(C) I dilute acepromazine to 1 mg/ml and butorphanol to 2 mg/ml in the same bottle, which allows me to give tiny, but accurate doses. It's essentially a 1:10 dilution of the acepromazine and 1:5 of the Torbutrol manufacturer's concentration. I then administer it according to a chart that is somewhat body surface area related. I copied it from a pain management/anesthesia symposium. For example, a 10 pound animal gets 0.3 ml SQ (i.e. 0.3 mg ace, 0.6 mg butorphanol). A 60-pound animal gets 1.2 ml (1.2 mg ace, 2.4 mg butorphanol). Sometimes I start with less in compromised patients, but have found it very safe and effective. I also avoid the ace in Boxers. (**Wood, G**)

(D) 0.3 mg/Kg IV Butorphanol and 0.15 mg/Kg IV Midazolam (**Braz-Ruivo, L**)

(E) 0.05 mg/kg acepromazine and 0.05 mg/kg butorphanol tartrate both given SQ, wait 15 min for effect (Avoid it in Boxers, really sensitive to acepromazine). Alternative to butorphanol tartrate is buprenorphine (0.01 mg/kg) (**Amberger C**)

Clinical Cardiac Management:

Given the probability of employment of cardiac medications (diuretics, ace inhibitors, pimobendan and others) initial **chemistry panel** (BUN, Creatinine primarily) and **urinalysis** (USG and proteinuria primarily) will be necessary to assess the safest Rx protocol based on the current renal function status. Rechecking Bun/creat/USG/Proteinuria after using enalapril/lasix or changing dosages is essential to management of the cardiac renal tightrope.

Both lasix and enalapril/benazepril can result in a pre-renal azotemia component and may not necessarily be going up owing to renal toxicity. Correlation of BUN/Creatinine with USG is essential to differentiate the problem as prerenal versus renal.

Coughing patients should have chest radiographs (and soft tissue neck films, if indicated) before echocardiograms. The echocardiogram will assess left atrial size, which will indicate whether CHF could be present. However, the echocardiogram will not fully identify pulmonary edema, collapsing trachea, a bronchial pattern, and other significant abnormalities that may be present in coughing animals. Lung tumors in the immediate echocardiogram window are generally noted. However, lung tumors and other lesions in the periphery of the lung field will not likely be noted in the echocardiogram, particularly in large animals. Lung lesions that are located adjacent to the thoracic wall, or within a few millimeters, may be assessed by ultrasound if the sonographer knows where to concentrate efforts outside the normal cardiac window. However, avoiding the ubiquitous lung air artifact can be challenging for the sonographer without a direct target provided by the chest radiographs. If a typical "goose honk" cough is in the history then inspiratory/expiratory radiographs of the cranial thorax will help rule in/out tracheal collapse and the echocardiogram can rule in or rule out concurrent pulmonary hypertension if present.

Blood Pressure: should ideally be done before all echocardiograms and before all abdominal ultrasounds in which hypertension may be a co-morbid condition. The patients can get stressed after the ultrasound due to positioning, cystocentesis, FNA etc. Stress and nervousness may lead to spuriously high results. Therefore, an area in the hospital that is calm and tranquil for blood pressure measurements such as the surgical recovery area should ideally be utilized for blood pressure measurements to avoid the "white coat" effect. The identification of true hypertension may change medication recommendations. Hypertension is a contraindication for renal biopsy and may be a contraindication for adrenal tumor FNA. We utilize the PetMap or Doppler instruments for blood pressure measurement and have them with us during the ultrasound consultation if needed. I (Lindquist) often suggest utilizing

Torbutrol IM ½ hour prior to BP measurement in excited patient. There are no studies regarding the influence of opioids on BP measurements but opioids are safe for the heart, and even indicated in cases of heart failure, as they do not affect the heart function. If the patient is persistently hypertensive when tranquil and on Torbutrol, it will likely be a realistic measurement in my experience.

Platelet Count: Necessary for invasive procedures such as FNA and core biopsy. Our coagulation machines measure PT and PTT only. In the absence of a platelet count, a manual estimation can be obtained from a well done blood smear with a single layer of red cells just touching each other at high power field (100x). Platelets can be estimated as the average number seen per high power field x a factor of 15. For example, if over 10 fields you have an average of 10 platelets per high power field, you have an estimate of 150,000 platelets/ul. A buccal mucosal bleeding time can be done with or without sedation. The BMBT assesses platelet function and will be abnormal in cases of severe thrombocytopenia (not mild) as well as in disorders of platelet function or vonWillebrand's disease. This is best performed using a standardized spring-loaded lancet that standardizes the cut (ex: Surgicut - can be obtained from the Animal Blood Bank). Normal values are clotting in less than 4 minutes. One disadvantage is that the results are operator dependant and it helps to have experience in performing this test for accurate results. Platelets counts greater than 50- 70,000 are essential for any sampling to be performed.

PT and PTT: Patient may still have post-biopsy or post- FNA bleeding even with normal clotting parameters and platelet count. Lack of tissue integrity may play a role in post sampling hemorrhage such as that found with severe hepatic lipidosis that creates a "Jello-Pudding" consistency to the liver. We tend to FNA these presentations instead of core biopsy unless indicated by an inflammatory clinical/pathological hepatic profile where core biopsy is often necessary for the structural, as opposed to cellular, diagnosis.

Chemistry panel that reports **increased bilirubin** should also note icteric serum. A hemolyzed sample may give mildly elevated bilirubin levels in the absence of truly icteric serum.

Barium: The presence of barium in the gastrointestinal tract may cause significant artifact. Barium studies should be adequately separated from the abdominal ultrasound when practical and possible. We rarely recommend barium studies any more owing to the persistent ability to rule in or rule out gastrointestinal obstruction based on sonographic criteria. There is still a role for barium in some cases that are not as straightforward but we have found them to be few and far between. See our abstract from ECVIM 2010 regarding this subject matter at www.SonoPath.com/resources.

Fasting: Ideally all animals should have had food fasting approximately 12 hours before the abdominal ultrasound. Exceptions include diabetic animals and young puppies/kittens. Dehydrated animals and animals with renal disease or PUPD should NOT have water removed. Water in the stomach can actually provide us a better window into regional structures.

If the area of interest is the **gastrointestinal tract** (particularly stomach and small intestine), fasting is necessary since the presence of food in the stomach may hide gastric lesions including tumours and foreign bodies.

If the area of interest is the **urinary** bladder, the urinary bladder should contain some quantity of urine since a very empty urinary bladder may mimic urinary bladder lesions. Wall thickness cannot be assessed with an empty or nearly empty bladder. As an example, some apparent thickening lesions or mass effects may disappear with the UB is distended with urine or saline. In male dogs, a urinary catheter may be easily placed in an awake, non-sedated animal to fill the UB with sterile saline. In female dogs and all cats, urinary catheters generally require sedation to place. Alternatively a dose of lasix may be employed to cause diuresis and additional UB filling in animals that can tolerate it medically. Ideally, all patients should have a full bladder at the time of the exam.

Vomiting and regurgitating animals should have a lateral chest radiograph to identify potential esophageal foreign bodies, megaesophagus, etc. Regurgitation can be very difficult to differentiate from vomiting sometimes, even if witnessed by the veterinarian or veterinary staff. A dirty way to differentiate vomiting from regurgitation would be to

utilize a pH stick to the vomitus to differentiate regurgitation from true vomitus.

Hepatic volume is best assessed on abdominal radiographs. The sonographer can subjectively assess diaphragmatic angles and caudal hepatic contour as well as gastric and pyloric displacement as supportive parameters for hepatomegaly or microhepatica. However a global assessment of hepatic size is best assessed through radiographs.

Owner Preparation For The Sonogram: We all have been frustrated that when the sonographer finds a lesion that necessitates sampling and the owner must be called, the owner is often not available at that crucial moment. Diagnostic efficiency often depends on sampling early during the moment of the sonogram saving time to avoid excessive delay in treatment or decision making on the direction for the patient. Therefore, preparing the owner for the potential of sampling (FNA, biopsy, drainage....) prior to the sonogram and potentially obtaining preauthorization will save time and allows the sonographer to sample then and there as opposed to allowing crucial time to elapse before a diagnosis can be made upon sampling in the following days.

Lastly, in some cases it is prudent to discuss bicavity examination as an option with the owner in advance. In certain situations, the sonographer may discover a finding that would suggest the need for a bicavity examination. For example, a dog with ascites may need an echocardiogram if there is suggestion of elevated right sided pressures due to the appearance of the hepatic vasculature; a cat with embolic disease may need an abdominal scan if the heart is normal and we want to evaluate the abdomen for other causative conditions such as neoplasia. Pre-emptive discussion will save time and possibly money if it is done as one exam rather than returning at a different time and, again, delaying the diagnostic efficiency process.

Contributors: Team New Jersey Mobile Associates

Eric Lindquist DMV (Italy), DABVP K9 & Feline Practice

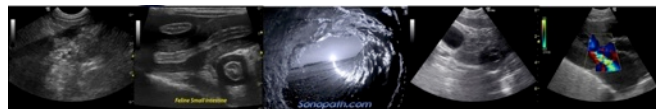
Cert. IVUSS

Director NJ Mobile Associates, Founder SonoPath.com

COME VISIT US AND LIKE US ON FACEBOOK!

"Make every obstacle an opportunity." Lance Armstrong

This Communication has Been Fueled By



SonoPath LLC. 31 Maple Tree Ln. Sparta, NJ 07871 USA

Via Costagrande 46, MontePorzio Catone (Roma) 00040 Italy **Tel: 800 838-4268**

For Case Studies & More Hot Topics In Veterinary Medicine For The GP & Clinical Sonographer Alike, Visit

www.SonoPath.com