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THORACOSCOPIC PERICARDECTOMY: WHEN? WHICH ONE? HOW?

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PERICARDIAL CLINICAL PATHOLOGY, WHEN?

Pericardial effusion is present in approximately 7% of dogs with clinical signs of cardiac disease. The most common causes of pericardial effusion in dogs are idiopathic pericarditis and neoplasia.

Idiopathic pericardial effusion refers to sterile, often hemorrhagic effusion in the pericardial space with no evidence of neoplasia, cardiac disease, trauma, or infection. German shepherd dogs, golden retrievers, Great Danes, and Saint Bernards appear to be predisposed. Male dogs appear to be affected more frequently than female dogs. Histologic examination of tissue specimens from dogs with idiopathic pericardial effusion reveals epicardial and pericardial thickening with associated inflammation.

The three most common neoplasms that cause pericardial effusion are hemangiosarcoma, aortic body tumors, and mesothelioma. Hemangiosarcoma constitutes 60% to 75% of all neoplasms that cause pericardial effusion in dogs. This tumor most commonly arises from the right atrial appendage. German shepherds and golden retrievers are reportedly predisposed. Metastasis to the lungs, spleen, and other organs is usually present in affected dogs at the time of diagnosis.

Aortic body tumors (chemodectomas), are found in approximately 10% of dogs with pericardial effusion. They arise from chemoreceptors in the pulmonary artery and aortic outflow tract. Brachycephalic breeds are believed to be predisposed to aortic body tumors. These tumors tend to be slow growing and are locally invasive. Up to 80% of dogs diagnosed with heart-base tumors have pericardial effusion at the time of diagnosis.

Mesothelioma is the most common primary tumor of the pericardium. It occurs in approximately 5% of dogs with pericardial effusion. Pericardial involvement may occur in isolation or in combination with other mesothelial surfaces. Male dogs are reportedly predisposed to the development of mesothelioma.

The aim of the creation of a window in the pericardium or the performance of subtotal pericardectomy is to establish permanent drainage for patients with pericardial effusion or constrictive pericarditis. Pericardectomy was also recently recommended as an additional surgical procedure for the treatment of chylothorax in both dogs and cats. In a previous study of dogs with ultrasonographically detected pericardial effusion without cardiac masses, the median survival time was 1218 days among dogs that underwent pericardectomy and 532 days among dogs that underwent conservative management. Another study of dogs with heart-base tumors found a prolonged median survival time of 730 days among dogs that underwent pericardectomy and only 42 days among dogs that did not undergo pericardectomy. In contrast, the survival times of dogs with right atrial masses and suspected hemangiosarcoma are largely unaffected by pericardectomy.

PERICARDECTOMY, WHICH ONE?

Pericardectomy has traditionally been performed by open thoracic surgery, either by median sternotomy or an intercostal approach.

The first publication on thoracoscopic pericardectomy in the field of veterinary medicine appeared in 1999. In early studies, thoracoscopic pericardectomy was associated with less postoperative pain and lower morbidity than traditional open thoracotomy and had the additional benefit of offering better visualization secondary to improved illumination and magnification. More recently, pericardectomy has also been performed thoracoscopically in association with concurrent right atrial tumor removal and thoracoscopic management of chylothorax.

Thoracoscopic creation of a 4- to 5-cm-diameter pericardial window has been recommended to palliate the clinical signs associated with pericardial effusion in dogs. In the study on which this recommendation is based, all dogs exhibited immediate resolution of cardiac tamponade after thoracoscopic partial pericardectomy. However, 77% of dogs had neoplastic pericardial effusion, and long-term follow-up was

available for only two dogs with idiopathic pericardial effusion. Consequently, no conclusions could be made regarding the long-term outcome of dogs with idiopathic pericardial effusion that underwent the pericardial window procedure. Whether a 4- to 5-cm pericardial window is large enough for long-term palliation of the clinical signs in dogs is unknown. In one study, dogs with idiopathic pericardial effusion treated by thoracoscopic creation of a pericardial window had significantly shorter disease-free intervals and median survival times than did dogs treated by subtotal pericardectomy via thoracotomy (P <0.05). However, no significant differences were found between the two groups for dogs presented with neoplastic pericardial effusion. The authors suspected that this difference in the outcome may have been related to inaccuracy of the initial diagnosis (the excised pericardium was too small for accurate histopathologic diagnosis) or limited visualization of the pericardial space prevented the identification of lesions such as small masses or nodules. Creation of a larger pericardial window or the performance of subtotal pericardectomy when performing thoracoscopic pericardectomy may be advisable.

The pericardial window procedure was evaluated in a more recent study. This procedure was associated with an acceptable complication rate (~25%), low mortality rate (7%), rapid operative duration (<1 hour), and relatively short hospitalization time (1 day). In that study, of seven dogs with idiopathic pericardial effusion, three died of uninvestigated lethargy, and two were euthanized 638 and 1165 days after surgery, respectively, because of dyspnea secondary to persistent pleural effusion.

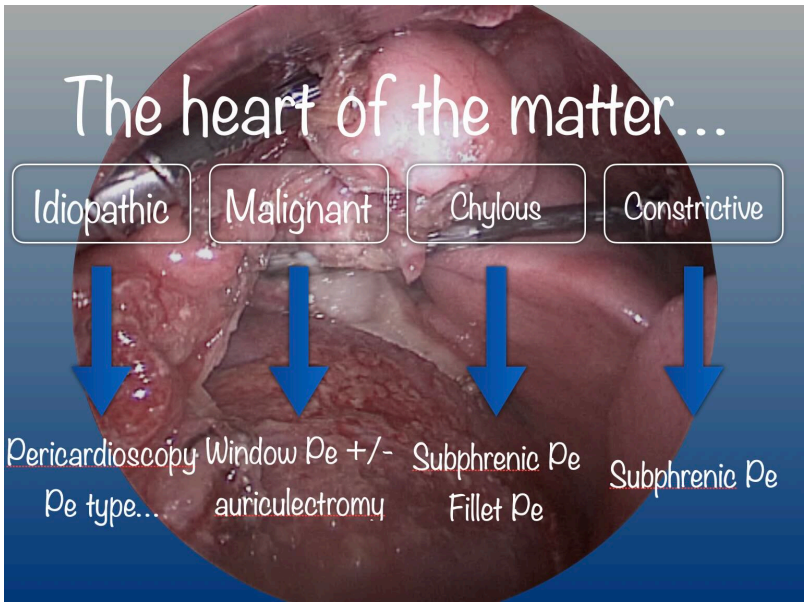
Although subtotal pericardectomy is more technically demanding than pericardial window, it can be performed with or without lung exclusion. Based on these studies, subphrenic pericardectomy via thoracoscopy has been considered to be the procedure of choice for dogs with presumptive idiopathic pericardial effusion. However, subsequent evidence has shed new light on the significance of the size of the pericardectomy.

Theoretically, subphrenic pericardectomy is optimal in cases of constrictive pericarditis and pericardial infection or neoplasia, and the pericardial window can be used in cases of neoplastic effusions, hemorrhage from neoplastic masses, inflammatory disease, and idiopathic effusions. However, differentiating pericardial malignancy from idiopathic effusion can be a diagnostic challenge and imaging such as echocardiography or CT may not be accurate in many cases. Consequently, multiple investigations have occurred in the past few years which have looked to determine the diagnostic value of thoracoscopy or pericardioscopy. In one pericardioscopic study of cadavers, subphrenic pericardectomy allowed for better viewing of most intrapericardial structures than did the creation of an apical pericardial window. Greater than 50% visibility of the right atrium, right auricle, and left auricle was possible. Subphrenic pericardectomy improved observation of the aortic root and pulmonary artery, which is important in cases of mesothelioma or chemodectoma.[4] Although subphrenic pericardectomy may not be necessary in all dogs with pericardial effusion, it may improve diagnostic accuracy during pericardioscopy. Similar results were confirmed in an experimental study in live dogs. In this subsequent investigation, epicardial exposure was compared after thoracoscopic pericardial window to exposure following the addition of vertical pericardial fillets. Thoracoscopic pericardial window with the addition of pericardial fillets, significantly improved epicardial exposure similar to subphrenic pericardectomy.

Recently, a study evaluating the outcomes in a series of dogs with idiopathic pericardial effusion undergoing pericardioscopy and thoracoscopic pericardectomy found that clinical outcomes were consistent with pericardectomy by thoracotomy but improved from those reportedly treated by thoracoscopic pericardial window. In this series, half of the dogs were found to have masses, nodules or adhesions visualized during pericardioscopy which were not identified on preoperative echocardiography. Of these nine dogs, half were ultimately diagnosed with a malignant effusion following histopathology of the pericardium, epicardium, pleura or mediastinal lymph node. The other half of dogs with masses, nodules or adhesions had pericardial biopsy consistent with pericarditis and therefore, idiopathic pericardial effusion. Interestingly, when survival was compared based on histopathology of the pericardium (i.e. malignant versus idiopathic pericarditis) alone, no difference was identified. However, when survival was compared between dogs based on the presence of masses/nodules or not during pericardioscopy, a significant difference was identified with median survival not being reached in the dogs without masses, nodules or adhesions present during pericardioscopy. The major recommendation of this investigation was that pericardioscopy with targeted biopsy of any masses or nodules affecting the pericardium, epicardium, pleura or mediastinal lymph nodes should be performed in dogs with presumptive idiopathic pericardial effusion to reduce the risk of an inaccurate diagnosis. A subsequent study in a series of dogs undergoing a 3-port right-sided thoracoscopic, subphrenic pericardectomy documented similar surgical time and clinical outcome for dogs with recurrent idiopathic pericardial effusion. Again, a neoplastic effusion was determined following subphrenic pericardectomy in a quarter of the dogs.

These findings suggest that a simple pericardial window without a complete pericarioscopic evaluation should be avoided in dogs with presumptive idiopathic pericardial effusion. Either a subphrenic pericardectomy or pericardial window with vertical fenestrations is advisable. Pericardioscopic evaluation should include: both the parietal and visceral pericardium, the epicardial surface especially in the region of the heart base, the right auricle and atrium as well as the pleural surface and mediastinal lymph nodes.

FIGURE 1. Algorithm for pericardectomy technique by disease process



REFERENCES

1. Dunning, D., Monnet, E., Orton, E.C., et al. (1998) Analysis of prognostic indicators for dogs with pericardial effusion: 46 cases (1985-1996). J Am Vet Med Assoc 212, 1276-1280.
2. Jackson, J., Richter, K.P., Launer, D.P. (1999) Thoracoscopic partial pericardiectomy in 13 dogs. J Vet Intern Med 13, 529-533.
3. Walsh, P.J., Remedios, A.M., Ferguson, J.F., et al. (1999) Thoracoscopic versus open partial pericardectomy in dogs: comparison of postoperative pain and morbidity. Vet Surg 28, 472-479.
4. Case, J.B., Maxwell, M., Aman, A., et al. (2013) Outcome evaluation of a thoracoscopic pericardial window procedure or subtotal pericardectomy via thoracotomy for the treatment of pericardial effusion in dogs. J Am Vet Med Assoc 242, 493-498.
5. Carvajal JL, Case JB, Mayhew PD, et al. (2019) Outcome in dogs with presumptive idiopathic pericardial effusion after thoracoscopic pericardectomy and pericardioscopy. Vet Surg 48 (S1):0105-0111.