

THERAPY

Miniinvasive treatment of pericardial effusions¹Bakos E, ¹Bakos M, ¹Dubaj M, ²Poliacik P*Department of Surgery, University Hospital Nitra, Slovakia. emil.bakos@post.sk***Abstract**

The aim of our study is to show the clinical potential of laparoscopic treatment of pericardial effusions. In spite of the small number of the patients we want to bring to attention the benefit of this miniminvasive procedure. The laparoscopic fenestration is indicated when the pericardial effusion persists after unsuccessful medical treatment and when clinical and echocardiographic signs of tamponade develop (Ref. 13). Full Text (Free, PDF) www.bmj.sk.

Key words: pericarditis, pericardial effusions, tamponade, laparoscopic fenestration.

A large pericardial effusion, resistant to medical therapy with NSAID and corticosteroids, with tendency to recur, remains an important therapeutic problem in cardiology. The etiology of the effusion may be well known – hypothyreosis, connective tissue disease, renal failure, post-irradiation, neoplasms, bacterial or viral infection. In many cases the etiology of the effusion remains unknown in spite of a maximal diagnostic effort. If the targeted causal treatment, or NSAID and steroid treatment, remains unsuccessful, the persisting large effusion with possible tamponade development brings us into a situation, where an evacuation of the pericardial effusion is needed. At present, the miniinvasive surgical procedures get a significant place in treatment of this complication.

Patients and methods

We started to use the laparoscopic pericardial fenestration to treat the pericardial effusions in 2001. In 2001–2006 our surgical department treated 18 patients with pericardial effusion, pretamponade or tamponade.

The patients indicated for laparoscopic fenestration were hospitalized at the Department of Internal medicine of University Hospital in Nitra, or Hospital of St. Svorad in Nitra. The indication was a large pericardial effusion resistant to medical treatment. The patients underwent a complex clinical, laboratory and echocardiographic evaluation. Hypothyreosis, renal failure and connective tissue disease were excluded. The serum was analysed for lyme boreliosis, leptospirosis, coxackie and ECHO viruses, EBV, CMV and HSV.

After a known primary etiology of pericardial effusion had been excluded, non steroidal anti-inflammatory drugs and oral steroids (1 mg/kg initial dose) were introduced. Subsequently we followed the response of the effusion to the treatment. The average duration of the oral steroid treatment was 2 weeks (7–20 days). We proceeded to the laparoscopic fenestration in the case of resistance to medical treatment, persistence of large effusion, or development of clinical or echocardiographic signs of tamponade. In critical patients we urgently performed subxiphoid pericardiocentesis with drainage and in the second stage, when the patient was stabilized, we proceeded to the laparoscopic fenestration. The follow up of the patients ranged from 3–8–24 month.

Technique of laparoscopic fenestration

For diagnostic or therapeutic purposes, the pericardium is safely approachable by laparoscopy. The surgery is performed under general anaesthesia in Lloyd-Davis position. The central venous pressure is monitored using jugular vein catheter during and after the pericardial window creation. After creation of 9–10 mmHg capnoperitoneum, a 10 mm video port is introduced. Two more 5 mm ports are placed in the left subcostal region – in

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the midclavicular line and the mid-axillary line. The medial port is used to catch the tendinous part of diaphragm and to move it caudally.

The pericardial window placement is localized into the centrum tendineum of the diaphragm, where the heart pulse is well visible through the central tendinous part. The window is created a bit medially of the strongest heart pulsation. A small incision using diathermic hook is made in this region. Under constant aspiration of the pericardial fluid the diaphragmal tendinous centre is cut using the endoscopic scissors and the pericardiotomy is made. When the pericardium is open, we lower the intraabdominal pressure to 7.5–8 mmHg, to avoid a barrotampnade. Using either harmonic scalpel or electrocoagulation we create 3x3 cm window for tamponade decompression. Through the pericardial window we visualise the secondary findings on the parietal and visceral pericardium. The pericardial effusion is sent for complex laboratory evaluation (cytology, bacteriology, serology, biochemistry for protein, glucose and LDH level, PCR for mycobacterial infection).

The average amount of the effusion ranges from 400 ml to 1200 ml. We make pericardial biopsy for histology. After the effusion evacuation and the pericardial cavity visualisation we place the endoclips to the pericardial window border to assure hemostasis and avoid an eventual diaphragm and pericardium dissection. Finally, the abdominal cavity is desuflated by the pneumoperitoneum release. During the procedure a prompt improvement in the ecg and respiratory parameters can be observed. During the post operative period the patient is monitored at the intensive care unit. The following day can be transferred to dept. of internal medicine. After the discharge we check the pericardial window patency using abdominal ultrasonography and echocardiography, eventually we investigate for clinical and echocardiographical signs of tamponade. During the follow up period (18 months in average – ranging from 8–24 months) we have not observed any pericardial effusion relapse.

We realize that our group of patients is small and that we will only be able to present definitive conclusions after evaluation of a larger group of patients. The problem is in the limited incidence of the pericardial effusions indicated for surgical treatment. Our aim will be to compare different methods of pericardiocentesis. We will also follow the incidence of the pericardial window closure using echocardiography and abdominal ultrasonography. Our method is valuable from the diagnostic and therapeutic point of view as it provides the possibility to evaluate the pericardial bioptic material, as well as microbiologic and serologic analysis. We put a big importance into the evaluation of the clinical state and the quality of life using the visual analogue scales LCS. (1)

After evaluating the studied criteria and aims we will specify the range of the indications for surgical treatment of pericardial effusions and we will show the relevance of this method.

We want to broaden the indications from benign to malignant effusions. Our indication criteria included also pericardial effusions in malignant diseases. We were inspired by the fact that the life expectancy in the oncologic patients depends on the

original diagnosis as well as the associated complications. The carcinomatosis is improbable, so the laparoscopic treatment is not contraindicated. In fact it is a palliative treatment of acute cardiac and respiratory symptoms associated with the oncologic disease, assuring a symptom relief (2).

Our current results show a significant contribution of this technique to immediate improvement of the patient's clinical state, of his hemodynamic parameters as well as to avoiding eventual relapses of the pericardial effusions.

Discussion

Definitive treatment of large pericardial effusion non responsive to any medical treatment remains a significant problem. Tendency to relapse or persistence of large effusions with tamponade development is a therapeutic problem as well (3).

Among the surgical procedures, the most effective and simple way to reach a prompt symptom improvement in urgent situations, is a percutaneous pericardiocentesis under echocardiography control, which is well tolerated also by critically ill patients. However, after single punctures or temporary drainage, the effusions relapse in 40 % of the patients (4).

In accord with the data from other authors we find the miniinvasive surgical techniques to be safer than simple pericardiocentesis, moreover, it is associated with lower risk of pericardial effusion recurrence.

The laparoscopic pericardial fenestration was first utilized by Ready to drain pericardial tamponade in 1992. Since then, a similar way of treatment was published by Meyer et al (5, 6). The laparoscopic procedure allows a pericardial effusion drainage to the abdominal cavity which provides the tamponade decompression. Creation of 3 cm pericardial window ensures a permanent pericardio-peritoneal drainage. Thanks to a high resorption capacity of the peritoneum the fluid does not gather in the pericardial cavity which provides a prevention of effusion relapses. The risk of loculated retentions and residual fluid collection is minimal (8). Comparing to subxiphoidal drainage the laparoscopic fenestration provides several advantages: it is safe, fast, minimally traumatizing, minimal morbidity, no need of xiphoid proc. resection or external drainage, no long-term secretion.

One of the miniinvasive procedures used for pericardial effusion treatment is also video assisted thoracoscopic pericardial fenestration with drainage of pleural cavity (9). Comparing the two miniminvasive techniques, in laparoscopic fenestration there is no need of chest drainage, no need of selective pulmonary ventilation, no chest and pulmonary complications are expected and it is less painful, with shorter time of hospitalization and recovery.

The advantage of the laparoscopic procedure is the fact that it is performed under the visual control, most of the pericardial cavity is available for visualisation and it is possible to view the epicardium too. Making the pericardial window means creating a pericardio peritoneal fistule which may provide a definitive solution (10).

With external drainage, some authors find important to insert the drains to prevent the relapse of the disease as well as to enable a better contact between visceral and parietal pericardial lamina (5, 8). The laparoscopic approach does not require a intrapericardial drain insertion.

In spite of the above mentioned advantages the indication spectre of laparoscopic fenestration is specific. We see the relevance to use this technique to drain pericardial effusions of pericarditis due to connective tissue disease, some metabolic and neoplastic disease. Symptomatic recurrent pericarditis resistant to medical treatment is as well indicated for permanent drainage by laparoscopic pericardial fenestration. Laparoscopic fenestration in malignant diseases is a theme of professional discussions. The potential risk of malignant cells dissemination during the laparoscopic or thoracoscopic fenestration is discussed (11). Distribution of the pericardial fluid containing malignant cells to abdominal cavity may not result in carcinomatosis with bowel infiltration, stenotisation and obstruction. As the life expectancy depends on the original diagnosis and the associated complications, the development of carcinomatosis would be improbable. The average life expectancy of the patients with pericardial effusion secondary to pulmonary cancer is 30 days, breast cancer is 135 days to months, nonHodkins lymphoma 1 year (does not differ in patients with and without pericardial effusions) (12). Laparoscopic treatment of pericardial effusions is not contraindicated (2). Laparoscopic fenestration in oncologic patients provides definitive pericardial decompression with symptom relief and fast recovery. The treatment is palliative, focused on the symptom relief and tamponade prevention (13, 5).

Conclusion

Modern laparoscopic trends in surgery have its place in managing of the serious pericardial complications. Pericardial effusions resistant to medical treatment are becoming a significant problem in internal medicine. Unsuccessful medical treatment can lead to recurrent effusions and tamponade development. In these cases the surgical treatment becomes relevant. Its efficacy is in the fast and in the specific moment the most appropriate surgical intervention. The potential of the surgical treatment has been broaden by the miniinvasive surgery. In the acute setting of a tamponade an immediate pericardiocentesis is indicated. After stabilization, in case of effusion recurrence, it is necessary to consider further surgical procedure, the most convenient for the

patient, the less mutilizing, and if possible, definitive. We find the laparoscopic pericardial fenestration to be an efficient surgical technique for definitive treatment of large pericardial effusions. It is a safe and simple method, carrying a minimal risk of complications. It broadens the spectre of surgical procedures used in management of pericardial effusions and tamponade.

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