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A minimal invasive approach in pleural effusions: cystofix catheter

Plevral effüzyonlarda minimal invaziv bir yaklaşım: sistofiks kateter

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ÖZ

Amaç: Günümüzde plevral effüzyon tedavisinde küçük çaplı katater kullanımı daha popüler bir uygulama haline gelmiştir. Bu çalışmada plevral effüzyon drenajı için sistofix katater takılmış hastalar yaş, cinsiyet, altta yatan patoloji, tedavi etkinliği ve komplikasyonlar açısından değerlendirildi.

Gereç ve Yöntemler: Plevral effüzyon nedeniyle sistofix kataterle tedavi edilen 59 hastanın verileri retrospektif olarak değerlendirildi. Masif plevral effüzyonlu hastalara lokal anestezi altında arka axiller hat 7. veya 8. interkostal aralıktan 14 F katater uygulandı.

Bulgular: Hastaların ortalama yaşı 65,9 ± 13,9 ve 37'si (%62,7) erkek idi. Vakaların etiyolojilerinin 11'i (%86) malign ve 48'i (%81,4) benign idi. Etiyolojik nedenler 30'unda (%50,8) konjestif sağ kalp yetmezliği, 14'ünde (%23,7) parapnömonik effüzyon ve 6'sında (%10,2) primer bronş kanseri idi.

Sonuçlar: Elde edilen bulgular, sistofix kataterin, küçük çaplı olması, kolay elde edilebilir ve uygulanabilir olması, tıkanmaması ve plöredez için uygun olmasından dolayı, benign ve malign effüzyon drenajında alternatif minimal invaziv bir teknik olduğunu desteklemektedir.

Anahtar Kelimeler: Plevral effüzyon, kataterler, minimal invazif cerrahi yöntemler, kalp yetmezliği

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ABSTRACT

Aim: Recently, catheters with small diameter are getting popularity in the treatment of pleural effusions. In this study, patients with cystofix catheter mounted for pleural effusion drainage were evaluated in terms of age, gender, underlying pathology, efficacy of treatment and complications.

Material and Methods: Data of the 59 patients treated with cystofix catheter due to pleural effusion were evaluated retrospectively. 14 F catheter was applied under local anesthesia from the 7th or the 8th intercostal space dorsal axillary line to patients with massive pleural effusion.

Results: The average age was 65.9 ± 13.9 and 37 (62.7%) of patients were male. 11 (18.6%) of the cases were having malign and 48 (81.4%) were having benign etiologies. Etiologic reasons were congestive right heart failure in 30 (50.8%) cases, parapneumonic effusion in 14 (23.7%) cases and primary bronchial carcinoma in 6 (10.2%) cases.

Conclusion: The results obtained from this study suggested that cystofix catheter can be used as an alternative minimal invasive technique in benign and malign effusion drainage, because of its small diameter, being easily available and applicable, avoiding clogging and being appropriate for pleurodesis.

Key Words: Pleural effusion, catheters, minimally invasive surgical procedures, heart failure

Introduction

Pleural effusions may occur due to various etiologies. In most cases, a fluid sample is necessary for differential diagnosis. In cases where the patients are symptomatic, the fluid should be drained. Common methods for the drainage of pleural effusions are thoracentesis, tube thoracostomy and use of pleural catheters with small diameter. Cystofix catheters are designed and used to drain urine accumulated in the bladder. However, several studies in the literature reported the use of cystofix catheters for drainage of pleural effusions [1-9].

In this study, we evaluated our patients with whom we used cystofix catheter (Rusch, Laboratoires Pharmaceutiques, Betschdorf, France) for the drainage of pleural effusion in terms of age, gender, underlying pathology, efficacy of treatment and complications.

Material and Methods

The permission was obtained from Cumhuriyet University, Faculty of Medicine, Ethic Committee of Clinical Researches in order to conduct the study before it starts (Date/number: 31.05.2011/169). Cystofix catheter mounted to 59 patients due to pleural effusion between September 2008 and April 2011 were evaluated retrospectively. Patients who do not regress with the medical treatment or relapse and with drainage indication due to massive fluid were enrolled in the study. Dyspnea was in the foreground in all of the patients. Breathing sounds have decreased on the side where the fluid exists. Posteroanterior chest x-ray was taken in all cases and computerized thorax tomography in thirteen cases were used for the diagnosis (Figures 1, 2).

Figure 1. PA chest x-ray image of a 31-year old male patient before drainage via cystofix catheter.

Figure 2. Thorax-CT image of a 61-year old male patient with pleural effusion.

Bleeding profiles of all patients were evaluated. Thoracentesis was performed and cytopathologic, microbiologic and biochemical analyses of the fluid were performed. 14 F cystofix catheter was applied from the 7th or the 8th intercostal space dorsal axillary line under local anesthesia (Figure 3).

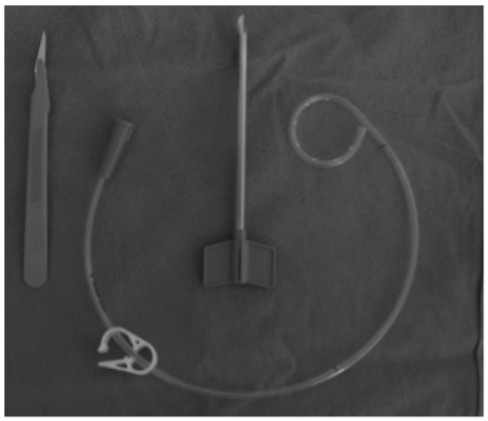

Figure 3. Image of the cystofix catheter.

The procedure was performed from the place that is convenient for the localization of the fluid or from the dorsal axillary line to patients in sitting position. The dorsal axillary line was chosen to drain the fluid easily and as it was comfortable for patients when lying. The catheter was mounted by percutaneous way after a small skin incision, fixed on the chest wall by placing a 2/0 silk suture and connected to the subaqueous drainage system (Figure 4).

Figure 4. Image of the cystofix catheter connected to under water drainage system.

The mean application time of the catheter was 5 to 10 minutes. Drainage of more than 1000 cc was not allowed in the beginning in order to avoid re-expansion lung edema in cases with massive fluid. Controlled drainage was provided in those patients. The drain was withdrawn in cases where a complete expansion of lungs in their post-drainage posteroanterior chest x-ray achieved and when the drainage decreases to 100-150 ml/day (Figure 5).

Figure 5. PA chest x-ray image of the same patient after cystofix catheter insertion.

Pleurodesis was performed in suitable patients due to continuous drainage or in relapsed cases. Talc was the preferred agent for the pleurodesis. Cases were evaluated in terms of age, gender, underlying pathology, efficacy of treatment and complications.

Statistical analysis

Data of our study were installed to Statistical Package for the Social Sciences (SPSS) version 14.0 program, frequency distributions were investigated and evaluated by chi square test. Data were indicated in arithmetic mean ± standard deviation and the level of significance was taken as 0.05. The result of $P < 0.05$ was accepted as significant.

Results

The mean age was 65.9 ± 13.9 (27-87) and 37 patients (62.7%) were male. Cystofix was mounted in 38 (64.4%) of cases to the right hemithorax, in 18 (30.5%) to the left hemithorax and bilaterally in 3 (5.1%) cases. In 11 (18.6%) cases the etiology of the pleural effusion was malign and in 48 (81.4%) cases it was benign. Congestive right heart failure in 30 (50.8%), parapneumonic effusion in 14 (23.7%) and primary bronchial carcinomas in 6 (10.2%) were the most frequent etiologies detected (Table 1).

Table 1. Etiologic factors of patients with pleural effusion.

Etiology	Number (n)	Percentage (%)
Thoracic malignancies	**8**	**13.6**
Primary bronchial cancer	6	10.2
Malignant mesothelioma	2	3.4
Extrathoracic malignancies	**3**	**5.1**
Liver cancer	1	1.7
Adenocarcinoma of the stomach	1	1.7
Hodgkin's Lymphoma	1	1.7
Benign Causes	**48**	**81.3**
Congestive heart failure	30	50.8
Parapneumonic Effusion	14	23.7
Chronic renal failure	2	3.4
Tuberculosis	1	1.7
Trauma	1	1.7
Total	**59**	**100**

Cystofix catheter was re-mounted in five (8.5%) patients due to relapse. Tube thoracostomy was performed to two patients due to pneumothorax which was not drained with the present catheter. Relapse was developed in 5 (11.4%) patients who received talc for pleurodesis. Although relapse is observed quantitatively more in women, it was not significant ($P = 0.059$, $P > 0.05$). Interestingly, four of cases who developed relapse had benign diseases. However, the effect of the etiology on relapse was not found significant ($P = 1.000$, $P > 0.05$). Morbidities such as empyema, wound site infection, re-expansion lung edema and catheter dislodgement and mortality were not observed during and after the procedure. The average withdrawal time of cystofix was 7 days (4-10 days).

Discussion

The search for a convenient, useful and low-cost method in treatment of pleural effusions still continues. Several techniques are being used and each of them has advantages and disadvantages. One of the important factors in determination of the method that will be used in our country is the accessibility of the material. Olden et al [1] reported that thoracentesis is the fastest and easy method in the drainage of pleural effusion but has a high recurrence rate. For that purpose, chronic indwelling pleural catheter, permanent pleurX catheter with small diameter, cystofix catheter, pleurocan having a valve with small diameter, thoracatch and foley catheters were used [2-8]. We preferred cystofix catheter in our patients because it is easily accessible.

When we compare the cost, although the cystofix catheter (21 Turkish Liras) is cheaper than a pleuracan catheter (Vygon, Ecouen, France) (100 Turkish Liras) that we used previously, it is much more expensive than a chest tube (1 Turkish Lira). Whereas the chest tube seems more economic, tube thoracostomy is a surgical interference in terms of the patient and it has some application difficulties and complications. In studies performed in recent years, it is known that catheters with small diameter are more popular in the treatment of pleural effusions [10]. In recent publications, it was reported that catheters with small diameter are mounted easily, with less pain and are effective and appropriate for pleurodesis [11,12]. Our insertion time for a cystofix catheter is approximately 5 to 10 minutes and it can be mounted in many settings such as emergency department, intensive care unit and bed-side without requiring several surgical instruments. Kılıç et al [6] similarly reported that cystofix catheter can be easily applied and it is an effective method but they do not have experience at intensive care and emergency units.

After the application of the cystofix catheter, drainage is quite easy and clogging issues like in case of pleuracan catheter are not experienced. Although this catheter is used for bladder drainage, it can be easily connected to the underwater seal system which is one of it's advantages. In cases of prolonged drainage, patients can be easily sent to their homes. This also decreases the hospitalization time of the patients. It is reported that permanent catheters such as chronic indwelling pleural catheters and pleurX catheters also shorten the hospitalization time. However, their disadvantage is that they can cause empyema since they stay in the patient for a long time [3,4]. No empyema were encountered in any of our patients.

Pleurodesis is a routine method performed in patients with a recurrent effusion. We did not have any problems while performing pleurodesis as the diameter of the catheter was wide enough for the passage of talk slurry.

Catheter with a small lumen may be a problematical in some cases. It was reported that if the drainage is unsuccessful with small catheter, it should be switched to a drain with big diameter [11]. We also solved the problem by switching to a drain with bigger diameter since 2 patients had expansion defect.

None of our patients who were drained had empyema. We don't use cystofix catheters in patients with empyema since we think that it can't provide a sufficient drainage.

The advantages of small-caliber drain were reported as, it reduces the infection risk, easier to use, relatively atraumatic for both operator and patient, less expensive, reduces hospital stay and less painful. Infection wasn't observed in our patients. The disadvantages of small-caliber tubes were the malposition of the small-caliber tube in thorax and unsuccessful for persistent leakage. This leaded to expansion problem but this problem was solved with a large-caliber tube. Similarly the expansion problem was solved with the large-caliber tube in our patients [13-15].

As a conclusion, this study suggests that cystofix catheter has some advantages such as it is economic, easily accessible and applicable. Although its diameter is small, no clogging is seen and it is appropriate for pleurodesis. It can be used effectively in benign and malign effusion drainage.

Declaration of conflicting interests

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