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Original Research

Effectiveness of Percutaneous Drainage on the Treatment of Mesh-Induced Seroma

Serkan Öner, Çetin Murat Altay

Department of Radiology, Karabük University Training and Research Hospital, Karabük, Turkey

ABSTRACT

Objective: To investigate the effectiveness of percutaneous treatment of mesh-related seroma to salvage the mesh.

Methods: Between October 2015 and December 2017, a total of four patients [three females, one male; mean age, 68.5±22 years (range, 61–83 years)] with repaired ventral hernia who underwent percutaneous drainage for the treatment of peri-mesh seroma were evaluated, retrospectively. In all patients, ultrasound was used to diagnose seroma and was the guiding imaging method during percutaneous procedures. General purpose pigtail-percutaneous drainage sets were used in all patients. Ethanol (96%) was used for sclerotherapy, and a fibrinolytic agent was used to destroy septa in multilocular collections. Laboratory investigations and comorbidities were evaluated in hospital data service, retrospectively. Mainly, the clinical success rates were evaluated, and technical success rates and procedure-related morbidity and mortality were also evaluated.

Results: A total of 11 percutaneous drainage sessions (median, 2; range 1–6) were performed in four patients. The mean volume of fluid collections was 807.3±3006 cc (median, 291 cc; range, 114–3120 cc). There was no significant difference between the mesh sizes. A technical success rate was 100%. There was no procedure-related morbidity and mortality. The mean of the recurrence time of the peri-mesh seroma was 3.5±11 months (median, 2 months; range, 1–12 months). In all patients, during the follow-up, seroma was accumulated repetitively.

Conclusion: Percutaneous treatment is an effective management option to salvage the mesh in patients with mesh-related seroma who are poor surgical candidates or whose mesh cannot be removed.

Keywords: Mesh-related seroma, percutaneous treatment, salvage the mesh

INTRODUCTION

Percutaneous drainage has become the first and the most effective treatment option in the management of the abdominal and thoracic fluid collection during the past three decades (1, 2). There are many reasons for fluid collection, such as an infection, inflammation, or iatrogenic and foreign body reaction. The hernia surgery technique has been modified due to new biological materials (3). There are two different construction materials of the mesh: the polypropylene (PP) and the expanded polytetrafluoroethylene (e-PTFE) mesh (4). There are some postoperative complications in hernia repair surgery using these materials. These complications are the fluid collection, mesh infections, small-bowel-related complications, spermatic-cord-and testicle-related complications, and hernia recurrence (4). The collection due to mesh used in hernia treatment may be a kind of a foreign body reaction. Fluid collections can be seroma or hematoma and can be located in front of or behind the mesh (5).

This present study examined the effectiveness of percutaneous treatment of peri-mesh seroma to salvage the mesh.

METHODS

The present study is a single-center retrospective study. Formal consent and informed consent for all individual participants included in the survey were obtained. The study was approved by the institutional ethics committee of the Karabük University (date: 07.02.2018, no: 2/7).

A total of four female patients [mean age 68.5±22 years (range, 61–83 years)], who underwent percutaneous drainage for the treatment of peri-mesh seroma after the abdominal wall hernia repair between October 2015 and December 2017, were evaluated in the present study. In all patients, non-absorbable meshes were used to repair the hernia.

All patients underwent ultrasound (US) with a 7.5 MHz linear probe (Toshiba, Minato, Japan) to diagnose peri-mesh seroma and to evaluate the feasibility of the percutaneous drainage before the procedure. The estimated volume of the seroma was calculated by the ellipsoid volume formula: $\frac{\pi}{6} \times transversediameter \times APdiameter \times longitudinaldiameter$.

A technical success was defined as an ability to drain a seroma without residue. Clinical success was defined as a preclusion of

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ORCID IDs of the authors: S.Ö. 0000-0002-7802-880X; Ç.M.A. 0000-0001-6258-3078

Corresponding Author: Çetin Murat Altay **E-mail:** cetinmurataltay@gmail.com

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the mesh removal and discharge of the patient without any complaint.

Comorbidities of all patients, such as diabetes, obesity, and chronic peripheral vascular disease, were investigated. Laboratory investigations included a complete blood count and erythrocyte sedimentation rate, which are the inflammation markers, and they were noted in hospital data service, retrospectively.

Percutaneous Drainage Procedure

Peri-mesh seromas were punctured under US guidance in all patients by the same interventional radiologist. Peri-mesh seromas were drained with general purpose pigtail drainage sets (used 8F or10F) using the Seldinger technique.

A fibrinolytic agent was applied into the multilocular seromas to destroy the septa. Alteplase 20 mL (Actilyse 20 mg, Boehringer İngelheim, Rhein, Germany) was utilized for fibrinolysis (Figure 1). Ethanol (96%) 30 mL was used to destroy the walls of the fluid collection when the seroma was recurrent.

Follow-up

The US was performed on the 3rd day after the drainage procedure to assess the location of the catheter and the volume of the fluid collection in all patients by the same interventional radiologist. When the fluid discharge was less than 10 cc per day, the pigtail catheter was withdrawn.

RESULTS

All patients complained of severe pain and tension in the field of the mesh. The mesh removal was not considered due to comorbidity, and it might have been the reason for the hernia recurrence. Because of these two reasons, percutaneous drainage was performed. In Patient A, diabetes and obesity were the comorbidities. Patient B suffered from peripheral arterial disease. Patients C and D were obese. The similar sizes of the mesh were used in all patients. There was no significant difference between mesh sizes. Patient characteristics were summarized in Table 1.

In laboratory investigations, the indicator of infection was not detected in all patients. There was no evidence of mesh infection. According to these findings, peri-mesh fluid collections were diagnosed as seroma.

A total of 11 percutaneous drainage sessions (median, 2; range 1–6) were performed in four patients. The percutaneous drainage was well tolerated by all patients. Technical success rate was 100%. Sclerotherapy with 95% ethanol was performed in Patients A and C. Fibrinolytic agents were used in Patient A (Figure 1). Thus, in all patients, peri-mesh seroma was drained without residual fluid.

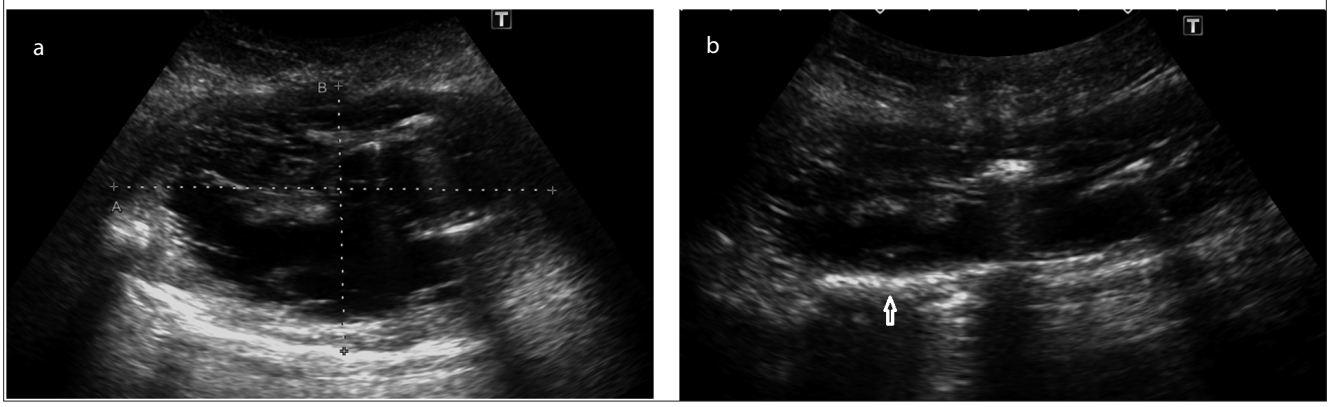
In Patient A, a total of six percutaneous drainage sessions were performed during the 1-year follow-up. Patient B did not accept recurrent drainage.

Table 1. Characteristics of patients

Patient	Age (years) and sex	Drainage number	Fibrinolytic agent	Alcohol sclerotherapy	Comorbidity	Recurrence interval (months)
A	65/F	6	No	Yes	Diabetes, Obesity	1, 2, 3, 4, 12
B	83/F	1	No	No	PAD	3
C	61/M	2	Yes	Yes	Obesity	1
D	65/F	2	No	No	Obesity	2

PAD: peripheral arterial disease; F: female; M: male

Figure 1. a, b. Peri-mesh seroma with multisepta (a) after the fibrinolytic agent was applied, (b) has shown destroyed septas , arrow have shown the mesh



The mean volume of seroma was 807.3±3006 cc (median, 291 cc; range, 114–3120 cc). The largest volume was in Patient A, and there was 3120 cc of seroma in the first drainage.

The mean recurrence time for peri-mesh seroma was 3.5±11 months (median, 2 months; range, 1–12 months). During the follow-up, the fluid collection was observed repetitively, and clinical success was achieved in all patients. There was no procedure-related morbidity and mortality.

DISCUSSION

The present study demonstrated the effectiveness of percutaneous drainage of peri-mesh seroma. There were no detected complications or mortality/morbidity. In patients with comorbidities, performing percutaneous drainage for mesh-related seroma was useful to salvage the mesh.

There is no gold standard surgical technique in hernia treatment (6). The recent involvement of new biological materials enabled a new technique of hernia surgery (3). Recently, the number of hernia repairs with mesh has increased, parallel with this condition, and mesh-related complications have become more common (4). Robinson et al. (7) showed major mesh-related complications in their retrospective study, which included 252 adverse events. The frequent mesh complications were infections (42%), while the seroma rates were at 4% and a relatively rare complication in their study. There are also articles that report seroma rates more frequently. Clinically and ultrasonographically, the presence of seroma was reported as 35% and 100%, respectively (8). In the current study, percutaneous treatment was performed in patients with clinically determined complaints, such as abdominal distention and severe pain. In an asymptomatic patient, the collection was not treated.

Salamone et al. (9) reported recurrent seroma despite the drainage in one case, and the mesh had to be removed for treatment. However, in the present study, 11 seromas in four patients were drained, and the meshes were not removed in all patients. The patients were discharged without any complaints. Susmallian et al. (8) treated four seromas with a percutaneous needle puncture without catheter drainage, and they did not prevent the accumulation of serum. Furthermore, the residual collection was observed at 100% and 50% after 30 and 90 days, respectively. In contrast, the catheter drainage was performed to treat 11 clinically symptomatic seroma in this present study, and residual collection was observed at 9% and 36% after 30 and 90 days, respectively. Our results may seem to be better. One of the reasons for relatively better results was that the catheter drainage was used instead of the needle puncture. Catheter drainage has some advantages such as forced shrinking, dilution for intense collection, and the use of ethanol or a fibrinolytic agent. Another advantage of catheter drainage is to salvage the infected mesh without the mesh removal (10). Another reason for better results may be the usage of a fibrinolytic agent to destroy the septa in the collection. Fibrinolytic agents have been used for many years as an effective and alternative treatment option incomplex seroma management (11). In our study, a fibrinolytic agent was administered in one patient who had a complex seroma. Septa of the seroma were destroyed, and the seroma was drained without residual collection.

Ethanol sclerotherapy of the renal cyst, splenic cyst, and lymphocele is a well-known, safe, and effective procedure (12-14). However, there are very few articles about the ethanol sclerotherapy of seroma in the literature. Sood et al. (15) published a comprehensive systemic review that included research articles on sclerotherapy for seroma between 1975 to 2017. This large review has revealed that there was only one patient whom Isaacson and Stavas (16) treated successfully with percutaneous ethanol sclerotherapy. Although seroma is a very common adverse effector complication after the hernia repair with a mesh, there appears to be very little information about sclerotherapy for wound seroma. This present study is unique and distinct from previous studies due to the etiology of seroma. Ethanol sclerotherapy was performed in two patients for mesh-related seroma. Recurrences of seroma were observed1month and-12months after sclerotherapy in two separate patients in our study. In our opinion, the most important reason for inadequate sclerosis is the etiology of the seroma formation. A foreign body reaction caused by the mesh may lead to seroma. The recurrence of seromas on follow-up can be considered the evidence of chronic inflammation due to a foreign body reaction.

There are some limitations to this study. Its retrospective nature and the small number of patients maybe restrictive factors. We consider that this is acceptable because a total of 11 drainages were performed despite the small number of patients. Prospective studies with a larger number of patients should be conducted.

CONCLUSION

Percutaneous treatment is an effective management option for mesh-induced seroma in a patient who is a poor surgical candidate. The use of a fibrinolytic agent may be considered in the complex seroma with septa. Although high rates of seroma recurrence are frustrating for patients, they can be acceptable for mesh salvage.

Ethics Committee Approval: Ethics committee approval was received for this study from the Ethics Committee of the Karabük University (date: 07.02.2018, no: 2/7).

Informed Consent: Written informed consent was obtained from patients who participated in this study.

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