Deep SSI after mesh-mediated groin hernia repair: management and outcome in an Emergency Surgery Department


SUMMARY: Deep SSI after mesh-mediated groin hernia repair: management and outcome in an Emergency Surgery Department.

Aim. Mesh-mediated groin hernia repair is considered the gold-standard procedure. It has low recurrence rate. Rarely a deep Surgical Site Infection (SSI) is seen when a synthetic prosthesis is used.

Case report. We describe a rare case of bilateral deep SSI after mesh-mediated groin hernia repair. Diagnosis was performed through the physical examination and radiological exams. Microbiological samples identified a methicillin-resistant Staphylococcus aureus responsible of the infection. Target therapy was performed and re-operation performed in order to remove the infected prosthesis and to apply a biological one to create the fibrous scaffold. During follow-up time, right side recurrence was observed. Tru-cut biopsy of fascia was obtained in order to identify the responsible of the recurrence.

Conclusion. Combination of antibiotic therapy and surgical re-operation seems to be the correct way to approach the deep SSI after mesh-mediated groin hernia repair. The use of biological mesh after synthetic removal seems to improve the final outcome.

KEY WORDS: Groin hernia - Deep SSI - Meshes.

Introduction

Mesh-mediated groin hernia repair is considered the best tension-free surgical technique since 1990s, and recurrence rate appears to be less significant than suture-repair technique.

Nevertheless the use of synthetic prosthesis exposes to the risk of Surgical Site Infection (SSI), even though prevention and treatment of infection has enabled considerable reduction in the number of post-operative infections.

It is considered not-suggested the use of antibiotic prophylaxis in not-complicated groin hernia when excellent skin disinfection and antiseptic rules are performed (1).

In 2004 Sanchez et al. (2) presented a review in which in patients with antibiotic prophylaxis the overall infection rates were 2.88% in hernioplasties using prosthetic meshes, compared to 3.78% in patients with herniorrhaphies; in patients without antibiotic prophylaxis the infection rates were 4.3% and 4.78% respectively. Basing on the results of this meta-analysis there is no clear evidence that routine administration of antibiotic prophylaxis for elective inguinal hernia repair reduces infection rate both in patients without and with mesh insertion.

Mesh infection rate ranged from 0.17 to 5%, and literature lacks of detailed information about. In 2003 McCormack et al. (3) reported a meta-analysis in which showed that the risk of mesh infection is lower with laparoscopy than with open technique.

When the mesh infection occurs, the diagnosis is always easy to do for pathognomonic signs and symptoms, usually encountered in the early post-operative period; it is not the same for the best treatment in terms of antibiotic therapy, in a conservative attempt, or surgical re-operation for prosthesis removal; appropriate treatment is not well defined in literature.

Conservative treatment is estimated to fail in 80% of cases (1).

In 1999 Taylor et al. (4) reported the importance of removing the mesh for radical treatment of SSI. The data were than confirmed in 2006 by Fawole et al. (5) further-
more demonstrating the not-increased risk of recurrence or residual pain; only 14.3% of recurrence rate at mean 44 months follow-up time.

Late-onset mesh infection is thus a very rare complication that often results in chronic groin sepsis and necessitates complete removal of the mesh. 

*S. aureus* is the usual infecting organism in SSI, although enteric organisms may also be cultured. Microbial investigation of purulent specimens constitutes a fundamental exam to set a specific antibiotic therapy (6).

**Case report**

A 54-year-old male, BMI 26.14, presented a history of bilateral groin hernia. After physical examination, surgical operation was indicated. Left groin hernia was first repaired in July 2015. Trabucco hernioplasty technique was performed. Despite the presence of inflammatory signs in the surgical site (redness and swelling persistent after weekly medications and FANS administration), he subsequently underwent right inguinal hernia repair in January 2016 at the same hospital and discharged in the same day. No antibiotic therapy or prophylaxis was performed. Weekly follow-up was planned. One week later, fever (T max 38.3°C) with chills, increasing wound swelling and redness, spontaneous pain and the appearance of purulent secretions were noticed. Antibiotic therapy (Amoxicillin-clavulanic acid 1 gr bid) and paracetamol 1 gr were prescribed for 10 days; further medications were performed for a month without any considerable improvement.

He was then admitted to our facility. The patient was afebrile upon admission (March 2016). Bilaterally inguinal hernioplasty sites were erythematous and swollen with spontaneous pain. Purulent material was draining from the wound. Fistulas were present bilaterally. Laboratory data demonstrated an increased total white blood cell count (15.78 × 10³ cells/µl) with neutrophilia (86,4%). An abdominal MRI (Figure 1) showed two fluid collections in the inguinal regions, which extend through the overlying skin fistula. Purulent samples were obtained and microbial examination with antibiotic susceptibility requested. When data became available, the targeted antibiotic therapy was initiated.

A methicillin-resistant *Staphylococcus aureus* (MRSA) was isolated from swabs taken from surgical wounds. Gentamicin (240 mg a day) and Linezolid (600 mg bid) were administered for two weeks. A diagnosis of deep SSI with prosthesis involvement was done.

At the end of target therapy surgical sites appeared not inflamed but fistulae were still present. Surgical removal of the prosthesis was indicated. A large amount of pus was discovered and drained opening the subcutaneous space. Extensive debridement of the preperitoneal space with repeated lavages was performed and the prosthetic meshes removed. Gore Bio A prosthesis were used for inguinal hernias repair. Made of polyglycolic acid and trimethylene carbonate, its scaffold is designed for tissue ingrowth and absorbs over 6 to 7 months. Bilateral Redon-drainage were positioned (Figure 2). The patient was discharged from the hospital three days after and he continued antibiotic therapy for other five days. Weekly follow-up was planned and performed for a month. Drainages and stitches were removed in 15th postoperative day. No complications occurred during this follow-up time. Six months after operation a follow-up surgical check-up was planned. Patient was afebrile for all the time, no pain nor inflammatory signs or symptoms reported. Right groin hernia relapse was present; left side not showed any sign of recurrence. A Tru-Cut ETG-guided biopsy (Figure 3) of aponeurotic tissue of right external oblique fascia was obtained and analyzed to understand the causes of relapse. No reticular fibers or collagen alterations were identified. On the other hand, low fibrous reaction and scarring formation was diagnosed, less than the left side (Figure 4).

**Discussion**

Mesh-mediated groin hernia repair is the most common elective surgical procedure performed. The use of mesh has become a standard technique linked to low recurrence rate and technical ease of the operation (7).
Postsurgical mesh related infections are rare but dangerous complications that usually necessitate mesh removal. The true incidence of mesh infection following inguinal hernia repair is unclear. Gilbert and Felton (8) reported an infection rate of 0.8% in a review of 1,834 mesh inguinal hernia repairs, whereas the pooled Lichtenstein series reported an overall infection rate of 0.003% for patch repairs of inguinal hernias.

The incidence of chronic mesh infection is highly variable among published series and might be related to the surgical technique, type of mesh, and strategies necessary to prevent infections (7).

A conservative treatment only with administration of antibiotics has to fail in 80% of cases (1). Conservative surgical approach with abscess drainage, sinus excision or partial mesh excision can fail and results in recurrent mesh infection (9, 10). On the other hand a complete restoration is obtained with the combination of specific antibiotic treatment on purulent specimen culture and mesh removal. This is suggested in order to reduce the risk of infection recurrence or severe complications, such as visceral adhesions or chronic fistulae (7).

Deep prosthetic infection tends to occur later than superficial SSI, which seems to be not-influenced by the use or type of mesh or fixation material (7). It occurs typically after a delayed period following mesh repair.

Different series report a mean time period between hernia repair and mesh infection diagnosis of 48 months (1, 7). Symptoms are often that of chronic inflammation such as inflamed skin and sinus formation with purulent spillage.

US – scan and MRI are useful for diagnosis and often performed (11).

The most common pathogens involved in mesh infections are *Staphylococcus species* (especially *S. aureus*), *Streptococcus* spp., gram-negative bacteria (mainly *Enterobacteriaceae*) and anaerobic bacteria. Methicillin-resistant *S. aureus* (MRSA) accounted for 63% of the isolated microorganisms in a study of mesh-related infections following incisional herniorrhaphy (4, 5, 7, 10, 12).

Theories on hernia formation are well known and are the pathophysiological basis of this common condition. The data shown the importance of nervous, vascular and muscular-aponeurotic alteration that can be found in biopsy specimen (13-19); similar alterations are demonstrated when incisional hernia is diagnosed after laparoscopy or laparotomy operations (20, 21).
Removal of the infected mesh may not result in recurrent herniation if sufficient fibrous scarring remains. The reaction includes an acute inflammatory reaction followed by fibroblast infiltration with fibrous reaction and scarring formation.

Recurrence rate after mesh removal arises from 6.7% (7) to 14.3% (5).

Our case reports the possibility that the lack of fibrous reaction and scar formation, that probably led to the rapid onset of the surgical site infection, is the reason of the groin hernia recurrence, excluding reticular fibers and/or collagen alterations (19).

According to the Ventral Hernia Working Group (VHWG) recommendations, use of synthetic mesh is appropriate for patients who present a low risk of infection or complication, while use of biologics is recommended for higher-risk patients. Nevertheless, there is no widely accepted consensus on appropriate mesh selection for surgical patients who present with elevated risk for contamination or postoperative complications (22).

The rationale for use of biologic mesh rather than synthetic mesh for ventral incisional hernia repair in the setting of contamination or infection depends on evidence demonstrating that biologic mesh supports tissue regeneration, marked by revascularization and cell repopulation. Better assimilation and revascularization may in turn lead to improved wound healing and better clearance of bacteria (23).

The use of biologic mesh in this setting is marked by low reported rate of the need for secondary surgical intervention for infected mesh removal.

Conclusion

In conclusion, despite the rareness of deep SSI occurrence after synthetic mesh-mediated groin hernia repair, it is a dangerous complication that needs of correct diagnosis (24-36) through physical examination and radiological exams, pathogens isolation for target antibiotic therapy and surgical removal of the synthetic mesh. The positioning of a biological prosthesis could be considered in order to reduce the risk of recurrence after synthetic prosthesis removal.

References

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