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Original Research Article

A Hospital Based Retrospective Observational Analysis of Mesh Related Infections

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Abstract

Aim: To analysis of mesh related infections in a tertiary care center.

Methodology: A retrospective observational study was conducted in the department of Surgery, D.M.C.H, Darbhanga, Bihar from January 2020 to December 2020 . and 60 patients were included in the study. All cases that underwent ventral and groin hernia surgeries and reported with mesh infections in the Department of General Surgery were included in the study. All cases of mesh infection during the study period (n=60) were analyzed. Demographics like age, sex and factors associated with mesh infection like BMI, comorbidities, time of presentation, tobacco consumption, ASA grade, type of hernia, type of hernia repair done were taken from medical records of the patients and their association with mesh infections were analyzed.

Results: Among 60 patients, 46 (76.7%) were males and 14 (23.3%) female patients. Majority of the patients were in the age group 40-50 (38.3%) followed by 50- 60 age group (30%). 33.3% cases were repaired with open repair and rest of the patients (66.7%) were repaired with lap repair. 85% patients had BMI more than 30 Kg/m2. In 40% patients, co-morbidities were present. Out of those patients, 33.33% had COPD only followed by 29.17% having COPD and type 2 DM. 20.83% had type 2 DM only and 16.67% had COPD and HTN. Polypropylene mesh was used in 80% patients, and the composite mesh was used in 20% patients who underwent IPOM.

Conclusion: Most of the patients took more than 5 months to report infection. Comorbidities were present in 40% patients and risk for complications after hernia repair is increased among patients with comorbid conditions. So, the proper selection of the patient, ensuring good control of comorbid medical conditions will prevent mesh infections.

Keywords: Mesh Infections, Laparoscopy, Inguinal Hernia.

Introduction

Hernioplasty is one of the most common surgeries performed by general surgeons. Incidence of mesh infection is 2%-4% for open inguinal hernia repair, 6%-10% for open incisional hernia repair [1] and 3.6% for laparoscopic incisional hernia repair [2]. A majority of ventral hernias are repaired using mesh, with synthetic mesh

being the most common choice [3]. Synthetic mesh has been well demonstrated to significantly reduce the hernia recurrence rate in ventral hernia repairs [4, 5]. However, synthetic mesh is susceptible to becoming infected in both clean and contaminated repairs, resulting in the need for additional procedures to remove the infected mesh and repair a now larger hernia defect [6, 7].

In today's environment, biologic mesh is primarily used in patients with class 3 (contaminated) and class 4 (dirty) wounds [8]. Its use in class 1 (clean) and class 2 (clean-contaminated) wounds has not been well studied. Its efficacy has been debated in the recent medical literature with some studies finding that biologic mesh is associated with higher recurrence rates than synthetic mesh and others finding similar performance between the two techniques [8, 9].

Mesh infection can lead to potential re-surgeries and morbidity to the patient and thus should be prevented. Factors influencing mesh infection are patient factors like COPD, high BMI, consumption of tobacco, advanced age, ASA>3, comorbidities [10]. Although repair with prosthesis was proven to reduce hernia recurrences, it associates a series of mesh-related complications like seroma, mesh erosion with sinus formation, chronic pain and discomfort, etc. Even in expert centers, postoperative wound related infective complications as high as 40-50% [11-13].

Seroma formation and mesh infection may also occur as long-term morbidities [14]. Nowadays, mesh removal is the preferred management strategy for mesh infection after incisional hernia repair [15, 16], which inevitably causes secondary trauma to the abdominal wall tissue and increases the risk of recurrence and other morbidities. The aim of this study was to analysis of mesh related infections in a tertiary care center.

Methodology

A retrospective descriptive study was conducted in the department of Surgery, D.M.C.H, Darbhanga, Bihar from January 2020 to December 2020. 60 patients were included in the study. All cases that underwent ventral and groin hernia surgeries and reported with mesh infections in the Department of General Surgery were included in the study. Files with incomplete and inappropriate data needed for the study were excluded from the study.

All primary hernia repairs were done on an elective basis, and antibiotics were given as per the protocol of our hospital. All cases of mesh infection during the study period (n=60) were analyzed. Demographics like age, sex and factors associated with mesh infection like BMI, comorbidities, time of presentation, tobacco consumption, ASA grade, type of hernia, type of hernia repair done were taken from medical records of the patients and their association with mesh infections were analyzed.

Results

Mesh infection was more common in males. Among 60 patients, 46 (76.7%) were males and 14 (23.3%) female patients. Majority of the patients were in the age group 40-50 (38.3%) followed by 50- 60 age group (30%). 33.3% cases were repaired with open repair and rest of the patients (66.7%) were repaired with lap repair. 85% patients had BMI more than 30 Kg/m2.

Table 1: Patient characteristics

Variables		N (%)
Gender	Male	46 (76.7%)
	Female	14 (23.3%)
Age (in years)	<40	12 (20%)

	40-50	23 (38.3%)
	50-60	18 (30%)
	>60	7 (11.7%)
Open repair	Open PP	12 (20%)
	Lichtenstein	8 (13.3%)
Lap repair	IPOM	11 (18.3%)
	SCOLA	12 (20%)
	TEP and eTEP	17 (28.3%)
BMI (Kg/m2)	<18.5	0
	18.5-25	0
	25-30	9 (15%)
	>30	51 (85%)

In 40% patients, co-morbidities were present. Out of those patients, 33.33% had COPD only followed by 29.17% having COPD and type 2 DM. 20.83% had type 2 DM only and 16.67% had COPD and HTN.

Table 2: Time of presentation of mesh infection after primary repair, Co-morbidities in cases of mesh infection

Variables		**N (%)**
Time (in months)	1-5	38 (63.3%)
	6-10	22 (36.7%)
Co-morbidities	Absent	36 (60%)
	Present	24 (40%)

Table 3: Details of co-morbidities present

Co-morbidities	**N (%)**
COPD	8 (33.33%)
COPD + Type 2 DM	7 (29.17%)
Type 2 DM	5 (20.83%)
COPD + HTN	4 (16.67%)

Parenteral cephalosporin was used in 95% patients and amoxicillin-clavulanic acid in 5% patients. Antibiotic has repeated if the procedure was beyond 2 hours. After postoperative day 2, patients were switched over to oral antibiotics for three days. Likewise, during the second admission, i.e., when the patient was admitted with mesh infection, 95% patients were given cephalosporin, and 5% patients were given Piperacillin tazobactam. Polypropylene mesh was used in 80% patients, and the composite mesh was used in 20% patients who underwent IPOM.

Table 4: Antibiotics used in cases of mesh infection and mesh used

Antibiotics		**N (%)**
1st admission	Cephalosporin	57 (95%)
	Amoxicillin clavulanic acid	3 (5%)
2nd admission	Cephalosporin	57 (95%)
	Piperacillin tazobactam	3 (5%)
Mesh used	Polypropylene mesh	48 (80%)
	Composite mesh	12 (20%)

Discussion

Mesh infection is a type of surgical site infection (SSI). Patient factors known to increase the risk of SSI and mesh infection are morbid obesity, tobacco abuse, chronic obstructive pulmonary disease (COPD), diabetes mellitus (DM), and immunosuppression [17].

Abdominal wall and inguinal hernia are common clinical scenarios in surgical practice. It is widely accepted that any sizable abdominal wall defect requires placement of mesh for reinforcement of repair and longer recurrence-free period [18]. SSI is defined as infections occurring within 30 days after surgery and affecting either the incision, organs, or body spaces at the site of the operation [19]. The incidence of SSIs varies across surgical procedures, with a range of 0.1% to 50.4% reported in a systematic review by Korol et al. [20]

Data showed that the laparoscopic inguinal hernia repair is associated with a lower incidence of mesh infection than an open procedure [21]. Nevertheless, thorough sterilization of laparoscopic instruments is more challenging and the instruments are more prone to carry debris or organisms that can lead to infections [22].

The risk for complications after hernia repair is increased among patients with comorbid conditions, such as COPD or diabetes [23]. Likewise, the body mass index of >30kg/m2 was associated with mesh infection. Proper selection of the patient, ensuring good control of comorbid medical conditions will prevent mesh infections [24]. Micro porous, multifilament mesh, and laminar mesh construction increase the surface area for bacterial adherence, impede leukocyte migration for bacterial clearance and leads to biofilm formation [25].

Studies by Rosemar A et al. and Lledo JB et al. have reported that patients with a BMI>25 kg/ m2 had 50% higher risk of surgical site infection than those with normal body weight, thereby concluding that obesity is an independent risk factor for mesh infection following inguinal hernia repair [26, 27]. A study by Yang H et al. showed that obesity (46.5%), smoking (39.3%) and diabetes (8.9%) were significant risk factors for mesh infection [28].

In our study, polypropylene mesh was used in 80% patients and composite mesh in 20% patients who underwent IPOM repair. Different guidelines exist to treat mesh infections but not very clear evidence in the literature to support a single optimal approach. While some studies prefer conservative management, some others prefer complete mesh removal. Large pore monofilament mesh seems to be salvable in a majority of cases, particularly when placed in an extra peritoneal position, while micro porous, multifilament, and composite meshes typically require explanation [29,30].

Conclusion

Most of the patients took more than 5 months to report infection. Comorbidities were present in 40% patients and risk for complications after hernia repair is increased among patients with comorbid conditions. So, the proper selection of the patient, ensuring good control of comorbid medical conditions will prevent mesh infections.

References

1. Turner EJ, Owen ER, Reddy K. Necrotising fasciitis following inguinal hernia repair. Case Reports, 2009 Jan, bcr0120-091535.
2. Cevasco M, Itani KM. Ventral hernia repair with synthetic, composite, and biologic mesh: characteristics, indications and infection profile. Surgical infections. 2012 Aug;13(4): 209- 15.
3. Kokotovic D, Bisgaard T, Helgstrand F. Long-term recurrence and complications associated with elective

incisional hernia repair. JAMA. 2016; 316(15):1575–82.
4. Luijendijk RW, Hop WC, van den Tol MP, et al. A comparison of suture repair with mesh repair for incisional hernia. N Engl J Med. 2000;343(6) :392–8.
5. Nguyen MT, Berger RL, Hicks SC, et al. Comparison of outcomes of synthetic mesh vs suture repair of elective primary ventral herniorrhaphy: a systematic review and meta-analysis. JAMA Surg. 2014;149(5):415–21.
6. Deerenberg EB, Mulder IM, Grotenhuis N, et al. Experimental study on synthetic and biological mesh implantation in a contaminated environment. Br J Surg. 2012; 99(12): 1734–41.
7. Kissane NA, Itani KM. A decade of ventral incisional hernia repairs with biologic acellular dermal matrix: what have we learned? PlastReconstr Surg. 2012;130(5 Suppl 2):194S–202S.
8. Mulder IM, Deerenberg EB, Bemelman WA, et al. Infection susceptibility of crosslinked and non-crosslinked biological meshes in an experimental contaminated environment. Am J Surg. 2015;210 (1): 159–66.
9. Rosen MJ, Krpata DM, Ermlich B, et al. A 5-year clinical experience with singlestaged repairs of infected and contaminated abdominal wall defects utilizing biologic mesh. Ann Surg. 2013;257(6):991–6.
10. Yang L, Wang H, Liang X, Chen T, Chen W, Song Y, et al. Bacteria in hernia sac: an important risk fact for surgical site infection after incarcerated hernia repair. Hernia. 2015 Apr;19(2) :279-83.
11. Bikhchandani J, Fitzgibbons RJ. Repair of giant ventral hernias. Advances in surgery. 2013 Sep; 47(1): 1-27.
12. Mathes T, Walgenbach M, Siegel R. Suture versus mesh repair in primary and incisional ventral hernias: a systematic review and meta-analysis. World journal of surgery. 2016 Apr; 40(4):826-35.
13. Helgstrand F, Rosenberg J, Kehlet H, Jorgensen LN, Bisgaard T. Nationwide prospective study of outcomes after elective incisional hernia repair. Journal of the American College of Surgeons. 2013 Feb;216(2):217-28.
14. Kokotovic D, Bisgaard T, Helgstrand F. Long-term recurrence and complications associated with elective incisional hernia repair. Jama. 2016 Oct;316(15):1575-82.
15. Bueno-Lledó J, Torregrosa-Gallud A, Carreño-Saénz O, García-Pastor P, Carbonell-Tatay F, Bonafé-Diana S, et al. Partial versus complete removal of the infected mesh after abdominal wall hernia repair. The American Journal of Surgery. 2017 Jul;214(1):47-52.
16. Hanna M, Dissanaike S. Mesh ingrowth with concomitant bacterial infection resulting in inability to explant: a failure of mesh salvage. Hernia. 2015 Apr;19(2):339-44.
17. Breuing K, Butler CE, Ferzoco S. Franz m, Hultman CS, Kilbridge JF. Incisional ventral hernias: Review of the literature and recommendations regarding the grading and technique of repair, J Surg. 2010;148(3):544-58.
18. Pauli EM, Rosen MJ. Open ventral hernia repair with component separation. Surgical Clinics. 2013 Oct; 93(5):1111-33.
19. Hagihara M, Suwa M, Muramatsu Y, Kato Y, Yamagishi Y, Mikamo H, et al. Preventing surgical-site infections after colorectal surgery. Journal of Infection and Chemotherapy. 2012 Jan; 18(1):83-9.
20. Korol E, Johnston K, Waser N, Sifakis F, Jafri HS, Lo M, et al. A systematic review of risk factors associated with surgical site infections among surgical patients. PloS one. 2013 Dec;8(12):e8 3-743.
21. McCormack K, Scott NW, Go PM, Ross S, Grant AM; EU Hernia Trialists

Collaboration. Laparoscopic techniques versus open techniques for inguinal hernia repair. Cochrane Database Syst. Rev. 2003;(1):CD00-1785.
22. Chowbey PK, Khullar R, Sharma A, Soni V, Baijal M, Garg N, et al. Laparoscopic management of infected mesh after laparoscopic inguinal hernia repair. Surgical Laparoscopy, Endoscopy & Percutaneous Techniques. 2015 Apr;25(2):125-8.
23. Liang MK, Holihan JL, Itani K, Alawadi ZM, Gonzalez JR, Askenasy EP, et al. Ventral hernia management. Annals of surgery. 2017 Jan;265(1):80-9.
24. Vagholkar K, Budhkar A. Combined tissue and mesh repair for midline incisional hernia. (A study of 15 cases). Journal of medical science and clinical research. 2014;2(8):1890- 900.
25. Perez-Koehler B, Bayon Y, Bellón JM. Mesh infection and hernia repair: a review. Surgical Infections. 2016 Apr; 17(2):124-37.
26. Rosemar A, Angerås U, Rosengren A, Nordin P. Effect of body mass index on groin hernia surgery. Annals of surgery. 2010 Aug 1;252(2):397-401.
27. Lledo JB, Quesada YS, Gavara IG, Urbaneja JV, Tatay FC, Diana SB, Pastor PG, Valdelomar RB, Pallardo JM. Infección de la prótesis en la reparación herniaria. Nuestra experiencia en 5 años. Cirugía Española. 2009 Mar 1;85(3):158-64.
28. Yang H, Xiong Y, Chen J, Shen Y. Study of mesh infection management following inguinal hernioplasty with an analysis of risk factors: a 10-year experience. Hernia. 2002;24(2):301-305.
29. Beffa LR, Warren JA. Management of mesh infection. In Textbook of Hernia. Springer, Cham.; c2017. p. 395-405.
30. Hasibuan D. A., & Petrus A. Character Determination in Elementary School Children of Madrasah Ibtidaiyah Al Jamiyatul Washliyah in 2021 Based on the Fingerprint of Right Hands. Journal of Medical Research and Health Sciences, 2021; 4(11): 1545–1550.