ORIGINAL ARTICLE

Frequency of surgical site infections and surgical site occurrences requiring procedural intervention in patients undergoing inguinal hernia repair

Javeria Iftikhar, Batool Zehra, Rabbia Zubair, Muhammad Ali Channa, Mir Arsalan Ali, Fatima Zehra

Abstract:
Objectives: To determine the frequency of surgical site infections and surgical site occurrences requiring procedural intervention in patients undergoing inguinal hernia mesh repair.
Material and Methods: A cross sectional observational study was conducted over a period of one year, between Feburary 2021 and Feburary 2022. Data of patients with diagnosis of uncomplicated primary inguinal hernia undergoing mesh repair was documented and analysed.
Results: Out of 80 patients 10 patients (12.5%) ages between 18-70 years, developed SSI in 5% subjects and SSOPI hematoma (1.6%) and seroma (3.2%) in wound. Therefore they required minor procedural intervention like drainage, washout and stitch removal.
Conclusion: This study establishes frequency of surgical site infection and surgical site occurrences requiring procedural intervention single dose of antibiotic after mesh repair for uncomplicated inguinal hernia which will set a reference point for future studies.

Received
Date: 2nd May, 2022
Accepted
Date: 14th January, 2023

Keywords: Seroma, surgical site infection, hematoma

Hamdard University Hospital, Karachi
J Iftikhar
B Zehra
R Zubair
MA Channa

Ziauddin Medical College, Karachi
MA Ali
FZ Khan

Correspondence:
Dr. Javeria Iftikhar,
Assistant Professor,
Department of Surgery,
Hamdard University Hospital, Karachi.
Cell No:+92 312-6323055
email: docjv2011@gmail.com

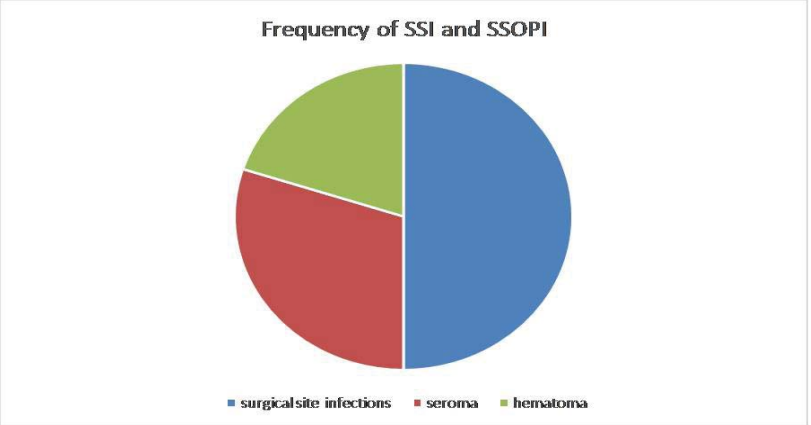
Introduction:
Amongst all abdominal hernia, inguinal hernias contribute to around 75% of the total abdominal hernia. It usually presents with a reducible or irreducible inguino-scrotal swelling which enhances on cough impulse or any other maneouver in which abdominal pressure is increased. Patient's complains may variate from mild pain and heaviness to severe pain in cases with possible strangulation. Treatment being surgical management either open Lichtensteinprolene mesh repair or laparoscopic. Women have 3% risk while men have 27% risk to acquire these hernias during their lifetime. Open repair is more popular, provides an effective, tension free repair. It is a clean surgery, therefore extensive antibiotic coverage for long durations is not required as the pre-empted risk of SSI is around <1% only in uncomplicated inguinal hernias. Its pros are less pain and early post-operative recovery but alike all surgical procedures has certain post-operative complications like seroma formation, hematoma formation, wound infection and foreign body reaction, post-operative and chronic scar pain.[1,2]

Surgical site infection is the most frequently stated complication in relatively clean cases of mesh hernia repair. The occurences of a possible infection should be looked into if patient has fever, wound edema and erthyema with discharge. On survey of various studies, amoxycillin and first generation cephalosporins have been used for prophylaxis.[3] Although evidences are present that prolong use might lead to antibiotic resistances.[4]

The frequency of surgical site infections (SSIs) after this repair diverges extensively due to certain factors like surgical technique pre and per-operative sterilization methods and maneuvers. Unfortunately SSI after hernia repair may risk in hernia recurrence.[3] SSI often results in an increase in hospitalization time, associated increase in expenses, and a decreasein quality of life. The identified risk factors for SSI range widely and remain controversial.[5]

Table 1:

Surgical site Occurrences	No of patients N=10/80	% of SSI and SSOPI 12.5%
SSI	5	6.25%
Seroma	3	3.75%
Hematoma	2	2.5%
Abscess	0	0%
Mesh Infection	0	0%



Wound infection following mesh repair is one of the probable impediment, which can be a point of concern for the surgeons, especially working with limited facilities. With the use of mesh there is added chance of acquiring infection as mesh can offer a optimum medium for bacterial colonization and propagation.[6] The rate of infection is predisposed by associated co-morbidity and seem to be augmented in patients with diabetes, immunosuppression, obesity and co-existing complications like seroma or hematoma at wound site.[6]

Material and Methods:

A cross sectional observational study was conducted over a period of one year, between Feburary 2021 and Feburary 2022. Data of patients with diagnosis of uncomplicated primary inguinal hernia undergoing mesh repair was documented. Patients of both genders, with ages between 18 to 70 years. Peadriatric patients with hernias were excluded along with complicated hernia with possible strangulation, obstruction and recurrence. Patients with diabetes, chronic liver disease or on antibiotic therapy for other pathologies were also excluded.

Informed consent was taken in patients meeting our inclusion criteria. Single per operative dose of injection amoxycillin-clavulanate at time of induction was administered. Operative site was shaved on operative table and skin was prepared with povidone scrubbing. Draping was done as per aseptic technique. Standard Lichenstein's mesh repair was done, followed by layered closure after mesh placement. Gloves were changed before mesh placement along with minimal handling. Skin was closed using prolene 2/0 interrupted sutures. Aseptic dressing done. Patient was post-operatively kept on IV analgesics only.

No dose of antibiotics was further administered. Patients were discharged on analgesics and advised to follow up on 7th, 14th and 30th day post-operatively. He was advised for daily baths and wound hygiene. Surgical site infections and futher occurences requiring procedural intervention like abscess, seroma, hematoma and mesh infections were observed, documented and analyzed.

Results:

In our study of one year, 80-patients coinciding the inclusion criteria were selected and operated, followed, data recorded and analyzed. Out of 80 patients 6 were females 74 were males.

Patients were followed up on their 7th, 14th and 30th post-operative day. Following observations were recorded. Out of 80 patients, (12.5%) 10 patients developed SSI and SSOPI. 2-patients (2.5%) developed hematoma in wound, which was managed conservatively by partial stitch removal at affected site and drainage followed by simple pyodine dressings.[3] patients (3.75%) developed seroma which presented mainly as stitch line erythema and edema on 7th post-operative day. Stitches were removed, seroma drained and followed by dry dressings. On 30th post-op day review wound was clean and healed by secondary intention by 30th post-operative day. 5-patients (6.25%) developed superficial surgical site infection on 7th post-operative day, presenting with purulent discharge, edema and

erythema of wound. Few stitches were removed, pus drained, pus culture swab sent. Cavity was washed thoroughly and pyodine pack was placed. Patients were started on tablet amoxycillin-clavulanate 1gm BD for 7 days. Patients followed up with culture reports after 48-hours. 2-patients yielded no growth, staph aureus was isolated in pus culture of 2-patients with concurrent sensitivity to amoxycillin-clavulanate, therefore it was continued for 7 days. 1-patients amongst 5 were detected with pseudomonas infection sensitive to ciprofloxacin. Therefore they were switched to sensitivity drug for 7 days.

Discussion:

In our study, conducted between the duration of 1-year we operated patients for uncomplicated inguinal hernia by Lichenstein Mesh repair. They were administered single dose of antibiotics, observed and analyzed for SSIs and SSOPIs. According to meta analysis conducted by Lolwah Al Riyees in Saudia Arabia in 2021, The European Hernia Society does not insist on an antibiotic prophylaxis in patients who have decreased chances of acquiring an infection. They included patients receiving variable 12-antibiotics from 4-different groups including penicillins, cephalosporins, quinolones, and macrolides. There was no significant benefit established.[2,3,7,8]

Repetitive administration of prophylactic antibiotics in elective inguinal hernia repair especially when implanting a mesh is still debatable. The frequency of surgical site infection (SSI) subsequent tohernia mesh repair is recorded in the global literature is between 0% and 14%. In another RCT (randomized controlled trial), printed by Mazaki et al., specifies that the practice of prophylaxis is fruitful for the inhibition of surgical site infection. Furthermore, injudicious and extensive antibiotic prophylaxis leads to the development of bacterial resistance and meaningfully upsurges healthcare expenses.[9,10]

In our study, Out of 80 patients 12.5% patients developed SSI and SSOPI, which was in accordance to the observations made in other similar studies. We also adhered and reinforced to the recommendation of single dose of antiobiotics pre-operatively.

According to Xourafas et al. and Nieuwenhuizen et al. use of mesh in complicated hernias leads to significant surgical site infection therefore these patients were not included in our study.[11,12] Carbonell also reinforced in his study the contraindication to place mesh in a contaminated hernia repair.[13] On the contrary, Mohd Matouk in his study deducted the possibility of that even in contaminated scenarios mesh repair causes less SSIs. Which was not consistent with our study.[14]

The frequency of surgical site wound infection was observed in 3.2%, and in these pus culture report showed that by Daudpota et al. Amongst which the most commonly occurring organism located were staphylococcus aures was the most frequent followed by E-coli.[1] similar SSI rate was observed by Lowlah after hernia surgery that is 4.27%.[3,13]

Our study had a little higher rate of SSIs, Out of 80-patients 12.5% patients developed SSI and SSOPI. In this group of 80-people 2-patients(1.6%) developed hematoma in wound, which was managed conservatively by partial stitch removal at affected site and drainage followed by simple pyodine dressings.[4] patients (3.2%) developed seroma which presented mainly as stitch line erythema and edema on 7th post-operative day. Stitches were removed, seroma drained and followed by dry dressings. On 30th post-op day review wound was clean and healed by secondary intention by 30th post-operative day. Similarly in a study conducted by Marwat et al, a total of 120-male patients were involved in the study. Out of 120 cases, 9(7.5%) patients had lengthy hospital stay due to complications like haematoma, seroma and wound infection. These patients were managed by giving intravenous antibiotics according to culture and sensitivity report, drainage and local wound care. None of their patients needed removal of mesh similar was in our case, procedural intervention was limited to simple drainage and dressings only mesh removal was not required.[6]

In another study by Baucom, SSOPIs like cellulitis, seroma, hematoma were observed in 62-patients amongst 632 subjects. There were 368 SSOs in 193 patients (31%); an SSOPI occurred in 9.8 % (n = 62). The most common SSOs were cellulitis (91/632), seroma (91/632), and serous drainage (58/632). They also evaluated features associated with SSO comprised obesity, immunosuppression, mesh repair, and operative times.[15]

Conclusion:
This study establishes frequency of surgical site infection and surgical site occurrences requiring procedural intervention single dose of antibiotic after mesh repair for uncomplicated inguinal hernia which will set a reference point for future studies.

Conflict of interest: None

Funding source: None

Role and contribution of authors:
Javeria Iftikhar, collected the data, references and did the initial writeup

Batool Zehra, collected the data, and helped in introduction

Rabbia Zubair, collected the data, and helped in discussion writing

Muhammad Ali Channa, critically review the article and made final changes

Mir Arsalan Ali, collected the data and interpretate the result.

Fatima Zehra Khan, collected the data, and helped in result writing.

References:

1. Abdul Qayoom D, Muhammed Ali A, Leelaram M, Shazia A, Dileep Kumar A, Nasir Ali W. Frequency of wound infection in open mesh inguinal hernioplasty. 2014.
2. Maheshwari MK, Singh R, Gupta SJISJ. Evaluation of administration of prophylactic antibiotics in mesh repair of inguinal hernia. 2019;6(5):1487-94.
3. Al Riyees L, Al Madani W, Firwana N, Balkhy HH, Ferwana M, Alkhudhayri AJESR. Antibiotic prophylaxis against surgical site infection after open hernia surgery: a systematic review and meta-analysis. 2021;62(3):121-33.
4. Kashif M, Khattak B, Iftikhar-ul-Haq M, Jan WAJJoMS. Frequency of surgical site infection in mesh repair for inguinal hernia. 2012;20(2):98-101.
5. Zhuo Y, Li X, Chen J, Zhang Q, Cai D. Surgical site infection following elective mesh repair of inguinal hernia: an analysis of risk factors. 2020.
6. Marwat AA, Waheed D, Ahmad WJGJoMS. FREQUENCY OF WOUND INFECTION IN INGUINAL HERNIORRAPHY WITH MESH REPAIR. 2013;11(2).
7. Kahla SM, Gaber A, Al-Rahawy MMJMMJ. The role of antibiotic prophylaxis in the prevention of surgical-site infection after hernioplasty in Menoufia University Hospital. 2019;32(3):1137.
8. International guidelines for groin hernia management %J Hernia. 2018;22:1-165.
9. Zamkowski MT, Makarewicz W, Ropel J, Bobowicz M, Kąkol M, Śmietański MJV, et al. Antibiotic prophylaxis in open inguinal hernia repair: a literature review and summary of current knowledge. 2016;11(3):127-36.
10. Mazaki T, Mado K, Masuda H, Shiono M, Tochikura N, Kaburagi MJTAJoS. A randomized trial of antibiotic prophylaxis for the prevention of surgical site infection after open mesh-plug hernia repair. 2014;207(4):476-84.
11. Nieuwenhuizen J, Van Ramshorst G, Ten Brinke J, de Wit T, van der Harst E, Hop W, et al. The use of mesh in acute hernia: frequency and outcome in 99 cases. 2011;15:297-300.
12. Xourafas D, Lipsitz SR, Negro P, Ashley SW, Tavakkolizadeh AJAoS. Impact of mesh use on morbidity following ventral hernia repair with a simultaneous bowel resection. 2010;145(8):739-44.
13. Carbonell AM, Criss CN, Cobb WS, Novitsky YW, Rosen MJJJotACoS. Outcomes of synthetic mesh in contaminated ventral hernia repairs. 2013;217(6):991-8.
14. Maatouk M, Safta YB, Mabrouk A, Kbir GH, Dhaou AB, Sayari S, et al. Surgical site infection in mesh repair for ventral hernia in contaminated field: A systematic review and meta-analysis. 2021;63:102173.
15. Baucom R, Ousley J, Oyefule O, Stewart M, Phillips S, Browman K, et al. Evaluation of long-term surgical site occurrences in ventral hernia repair: implications of preoperative site independent MRSA infection. 2016;20:701-10.