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FREQUENCY OF SURGICAL SITE INFECTION IN MESH REPAIR FOR INGUINAL HERNIA

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ABSTRACT

BACKGROUND: Hyperbilirubinemia is the most common cause of neonatal jaundice. Severe neonatal hyperbilirubinemia and kernicterus continue to be reported worldwide in otherwise healthy term infants. We conducted this study to estimate the incidence of severe neonatal hyperbilirubinemia and to determine underlying causes, improved knowledge of which would be valuable to help identify strategies for risk reduction.

METHODS: 100 infants of both sexes, of the age between 1-28 days, with no infection and Rh incompatibility were included in the study. The activity of G6PD was determined by a dye-reduction method screening test devised by Sigma Diagnostics USA. Complete blood counts (CBC) with reticulocyte count, serum bilirubin (total and indirect) were performed and the results were recorded for further analyses.

RESULTS: Out of the total 100 subjects, classified in two groups on the basis of presence of jaundice, 14 (14%) were G6PD deficient. The frequency of G6PD deficiency was markedly prominent, in neonates with jaundice.

DISCUSSION: G6PD deficiency is one of the major causes of jaundice in neonates. The study area also have a considerable number of G6PD deficient individuals. This indicates a need for a more thorough assessment of newborn infants and consideration of strategies to identify at-risk newborns, such as pre-discharge measurement of serum bilirubin levels and G6PD deficiency screening.

INTRODUCTION

Hernia by definition is the protruding of an organ or part of an organ through the wall that normally contains it. Hernia constitutes 10-15% of all surgical procedures, 80% being inguinal and 92% are in men[1]. Inguinal hernias are common through out the world. These account for 75% for all forms of hernias and more commons in males than females in ratio of 20:1[2]. Abdominal hernia repair consumes considerable health care resources worldwide.[3] In general if patient is fit an inguinal hernia should be repaired surgically[4]. Goals of hernia repair includes reduction of the contents, reperitonealization of the abdomen, repair of the fascial defect and restoration of normal abdominal wall contour[3]. Abdominal wall hernia repairs are common surgical procedures.[5] Day case surgery for inguinal hernia can be performed safely in carefully selected patient[6]. Various repair procedures fall into two categories. Fascial repair, tension free prosthetic repair and open preperitoneal mesh repair for recurrent inguinal hernia is a safe procedure[7]. Men presenting with inguinal hernia often have minimal symptoms, if any. Although elective surgery is often recommended to prevent complications, it carries the risk of hernia recurrence, pain and discomfort as well as the risks associated with anesthesia and surgery, such as hematoma and infection[8]. In recent years, use of prosthetic materials for inguinal hernia repairs has increased dramatically. Tension free repairs have gained popularity not only for recurrent or complicated hernia but for primary hernia repair as well.[9] Inguinal hernia repair with mesh is one of the most common procedures in general surgery and antibiotic consumption for preventive purposes is becoming a serious problem due to the risk of contribution to development of bacterial resistance and the significant increase in health-care costs[10]

Polypropylene mesh is the most widely used material in inguinal hernia repair.[11] It is the preferred prosthetic material for the tension-free hernioplasties because it handle well and become quickly incorporated, having reduced the recurrence rate below 1%[12]. Tension-free repair (with prosthetic mesh) involves the use of synthetic prosthetic materials for rebuilding the posterior inguinal wall. Tension-free repair reduces the recurrence rate, improves postoperative recovery, and lowers cost, it has become the gold standard procedure for repairing inguinal hernias[13]. Wound infection is potential complication for all inguinal repairs.[14] Wound infection usually appears between the fifth and tenth days after surgery.[15] The incidence of mesh infection during open hernia repair has been reported to be as high as 3%.[16] Surgical site infection after hernia repair is common[17]. Bacterial growth rate from wound cultures confirmed the superficial surgical site infection rate in all groups.[18] However, when there is established deep infection, there should be no unnecessary delay in removing an infected mesh is order to allow resolution of chronic groin sepsis[14]. It is a fact that there is high rate of infection in our setup so our aim was to find out the frequency and common causative organisms in surgical site infection in mesh repair for inguinal hernia, which was helpful in control of infection in these patients at an early stage and removal of mesh could not occurred in any case.

METHODOLOGY

This descriptive prospective study was done in Surgical Department of Peshawar Institute of Medical Sciences Hayatabad, Peshawar from July 2011 to March 2013.A total of 100 males having inguinal hernia in which mesh repair was performed were included in the study by convenient (non-probability) sampling technique after taking written informed consent. Patients with strangulated hernia were not included in the study. All patients with inguinal hernia presenting to out-patient department in which mesh repair was indicated, underwent through physical and clinical examination, detailed history of illness, site of hernia, duration and type of hernia, routine investigations like; blood urea, blood sugar, Hb%, urine routine examination, x-ray chest and electrocardiogram were performed in all patient and all patients were put on intravenous antibiotics preoperatively and were continued for 5-7 days postoperatively according to the general condition of the patients. All the patients in whom mesh repair indicated were operated in the general surgical operation theater on routine operative list. During the operation site and size, type of hernia and other information was noted. After the operation, all these patients were followed up in the ward by taking wound site examination, to know about early sign of wound infection. And if any pus or discharge was found, it was taken from wound site for culture and sensitivity to know the organism involved. After being discharged from hospital these patients were advised to come to out-patient department for any discharge or pus at surgical site. During the study period all the patients having surgical site infection were noted and thus frequency was calculated for these patients. All these information and other demographic features like, name, sex, age, address, were recorded in a proforma specially designed for this purpose.

All the studied variables that were; type of hernia, site of hernia, routine laboratory and radiological investigations, operation type, postoperative examination findings like; increasing wound pain, redness, edema, hotness, discharge, number of cases having surgical site infection, were analyzed for descriptive statistics. Frequencies, percentages were calculated for all these variables and mean $\pm$ standard deviation was calculated for age. Data interpretation, calculations and tabulations were done by using computer program SPSS for windows version[16].

RESULTS

A total of 100 male patients with primary and recurrent inguinal hernias were subjected to hernia repair with prolene mesh in this study. In this study the age of the patients was ranged from 35-95 years with mean age of 53.29 $\pm$ 13.48 years. Majority of patients, 28 (28%) were in the age range of 51-60 years (Table No. 1).

Age Incidence Of The Patients (n=100)

35 - 40 years	24	24%
41 - 50 years	22	22%
51 - 60 years	28	28%
61 - 70 years	19	19%
71 - 80 years	06	06%
years	01	01%
TOTAL	**100**	**100%**

In majority, 61 (61%) cases indirect inguinal hernia and in 39 (39%) cases direct inguinal hernia had found.

Surgical site examination findings revealed that wound redness was present in 11 (11%) cases, edema of the wound site was recorded in 10 (10%) cases, hotness was noted in 12 (12%) cases, discharge from wound site was noted in 08 (08%) cases (Table No. 2).

Surgical Site Examination Findings In Patients (N=100)

FINDINGS	NO. OF CASES	PERCENTAGE
Increasing wound pain	13	13%
Wound redness	11	11%
Wound discharge	08	08%
Wound edema	10	10%
Wound hotness	12	12%

The overall frequency of surgical site infection was found in 06 (06%) cases of mesh repair and culture reports showed that staphylococcus aureus was the commonest organism responsible for surgical site infection in 4 (4%) cases but in two cases staphylococcus epidermidis and Escherichia coli found in each. (Table No. 3).

Note: c/s of the discharge showed the result as per Table No.3. While in two cases it was just serous discharge, no organism found.

Table No. 3:

Incidence of Surgical Site Infection in Patients (n=100)

INFECTION	NO. OF CASES	PERCENTAGE
Staphylococcus aureus	04	04%
Staphylococcus epidermidis	01	01%
Escherichia coli	01	01%
TOTAL	**06**	**06%**

DISCUSSION

Hernia treatment has changed dramatically in the past 25 years. At the end of the 20th century, surgeons begun to repair hernias with a laparoscopic approach, but at about the same time, open mesh repair became popular. Both approaches are superior to the older techniques, but the open mesh repair is easier to learn, simpler to perform, and in follow up studies has about the same or lower recurrence rate. Older methods, such as the Bassini or McVay repair, can give acceptable results, at an acceptable cost[19]. Inguinal hernia repair is one of the most commonly performed surgical procedures. Although the disease is associated with considerable morbidity, mortality is rare, except in remote areas, where delay in treatment can lead to strangulation and death[19]. The repair of abdominal wall defects in potentially contaminated or grossly infected fields presents a difficult clinical problem. Polypropylene mesh is relatively contraindicated in these settings because of the potential for chronic infection[20]. Inguinal hernia is more likely to occur in men than 0in women because the spermatic cord passes through the abdominal wall in the inguinal region, leaving a site of natural weakness prone to hernia formation.[21] Therefore, in this study there were 100% males who were operated for inguinal hernia. Old age can not be considered as an absolute risk factor in the surgical treatment of inguinal hernia, which can also be stated for the majority of elderly people pathologies. The modern tension-free techniques have demonstrated in cardiopath patients the same advantages which have observed in elderly non cardiopath patients.[22] In our study there were 26% patients in the age ranges of 61-70, 71-80, and 81-above years (including 95 years old). They were operated under general anesthesia and managed well postoperatively. There was no mortality in any age group in this series. In our series of 100 patients mean age was 53.29 $\pm$ 13.48 years, which is comparable to some local studies[7,23]. In a local study mean age was 52 years (range 20-75). Indirect hernia was present in 305 (65.5%) patients while 160(34.5%) patients had direct hernia. There were 11 (2.4%) postoperative wound infections.[23] While in another local study mean age was 51 years. Fifty-one (78.4%) patients had direct while

fourteen (21.6%) patients had indirect recurrence. There were two (3%) wound infections[7]. The goals of a successful hernia repair include low recurrence rates, permanent relief of pain or discomfort and low incidence of peri and postoperative complications, such as wound infections and intra-abdominal adhesions[24]. Surgical site infection or wound infection was observed in our study in 06% patients. Wound infection was superficial and was managed with antiseptic dressing and antibiotics. No patient required mesh removal for control of infection. Our findings are comparable with a local study in which the incidence of wound infection reported as 7.5%.[25] In few other local studies the incidence of wound infection has been reported from 1% to 4% cases[19,26,27,28,29]. In an international study wound infection was seen in 5% patients of group A and in 4.3% patients of group B[30]. The risk of infection is there but use of antibiotics has overcome this problem[28]. Infection rate in our study was much more than reported at local and international level. Reasons for this high rates of infections could be that in our set up there are lack of facilities of proper cleaning and contamination free environment in operation rooms and wards at tertiary care hospitals, over crowding in hospitals, and majority of operations were performed by less experienced surgeons, as evident from our results. In another study the primary outcome was to determine the wound infection rate within one year. The overall infection among the entire study population was 2% (8 of 395) including 2% (4 of 199) of those receiving intravenous cefazolin and 2% (4 of 196) of those treated with oral ciprofloxacin. There was no statistically significant difference between groups (P=0.59). All the infections were superficial incisional surgical site infections, and none progressed to a deep infection. Escherichia coli was the most commonly isolated bacterium[31]. While in contrast to this study, in our study staphylococcus aureus was the commonest organism found in 4% cases and Escherichia coli was found in 1 (1%) case. In one study superficial surgical site infection developed in 3 patients (1.7%) from the antibiotic group and 6 (3.3%) from the placebo group (p = 0.50). One from each group developed deep surgical site infection. Both patients were readmitted and underwent repeated debridement, which eventually resulted in graft loss[9]. Post-discharge surveillance for 30 days is needed to determine the true incidence of surgical site infection (SSI). A study was undertaken to determine the incidence and risk factors for SSI after hernia repair. Results showed that 5.3% cases developed SSI. It was concluded that SSI after hernia repair is common and large clinical trials are required to determine whether the use of prophylactic antibiotics reduces the incidence of infection.[17] In our study discharge was noted in 08% cases.

Chronic pain is common after primary inguinal hernia repair in young males, but there is no difference in the pain associated with open mesh and non-mesh repair[32].

Postoperative increasing pain was complained by 13% cases of our study which is comparable with other national studies. It has been reported in one Pakistani study that the postoperative pain was complained in 10% patients of mesh repair and 7.1% in patients of Bassini's repair.[19] In another national study it has been reported that chronic pain was observed in 9% patients at 1 month and 6% at 6 months for mesh repair post-operatively.[33] It was reported to be 6% for prolene mesh and 8% for nylon darn in an international study[26].

In few other local studies moderate pain has been reported in 10% of cases postoperatively, 1% in first 24 hours and no pain after first week for mesh repair and 15% had immediate moderate pain after Bassini's repair. This was because of tension on suture lines in conventional (Bassini's repair)[27,28]

CONCLUSIONS

It is concluded from the results of our study that prolene mesh is a safe and better procedure because it is associated with fewer complications like infection and is strongly recommended that propylene mesh repair is the first treatment option for patients with primary and recurrent inguinal hernias with good antibiotics cover preoperatively.

REFERENCES

1. Ali M, Habiba U, Hussain A, Hadi G. The outcome of darning method of inguinal hernia repair using polypropylene in a district general hospital. J Postgrad Med Inst 2003;17:42-5.
2. Khan M, Khan SM, Sharafat S, Khan Z. Inguinal herniorrhaphy with Vicryl darn: experience with 1150 cases. J Postgrad Med Inst 2006;20:44-7.
3. Cingi A, Manukyan MN, Gulluoglu BM, Barlas A, Yegen C, Yalin R, et al. Use of re-sterilized polypropylene mesh in inguinal hernia repair: a prospective, randomized study. J Am Coll Surg 2005;201:834-40.
4. Knight R, Fenoglio ME. The use of Kugel mesh in ventral hernia repairs. Am J Surg 2002; 183:642-5.
5. Dunne JR, Malone DL, Tracy JK, Napolitano LM. Abdominal wall hernias: risk factors for infection and resource utilization. J Surg Res 2003;111:78-84.
6. Aslam M, Arain GM, Khan SA. Inguinal hernia day case surgery: study of 100 cases. Biomedica 2002;18:70-3.
7. Farooq O, Rehman B. Recurrent inguinal hernia repair by open preperitoneal approach. J Coll Physicians Surg Pak 2005;15:261-5.
8. Kendall C, Murray S. Is watchful waiting a reasonable approach for men with minimally symptomatic inguinal hernia? Can Med Assoc J 2006;174:1263-4.
9. Perez AR, Roxas MF, Hilvano SS. A randomized, double-blind, placebo-controlled trial to determine effectiveness of antibiotic prophylaxis for tension-free mesh herniorrhaphy. J Am Coll Surg 2005;200:393-7.
10. Terzi C. Antimicrobial prophylaxis in clean surgery with special focus on inguinal hernia repair with mesh. J Hosp Infect 2006;62:427-36.
11. Taneli F, Aydede H, Vatansever S, Ulman C, Ari Z, Uyanik BS. The long-term effect of mesh bioprosthesis in inguinal hernia repair on testicular nitric oxide metabolism and apoptosis in rat testis. Cell Biochem Funct 2005; 23:213-20.
12. Ansaloni L, Catena F, D'Alessandro L. Prospective randomized, double-blind, controlled trial comparing Liechtenstein's repair of inguinal hernia with polypropylene mesh versus Surgisis gold soft tissue graft: preliminary results. Acta Biomed Ateneo Parmense 2003;74 (Suppl 2):10-4.
13. Rodrigues AJ Jr, Jin HY, Utiyama EM, Rodrigues CJ. The Stoppa procedure in inguinal hernia repair: to drain or not to drain. Rev Hosp Clin Fac Med Sao Paulo. 2003;58:97-102.
14. Fawole AS, Chaparala RP, Ambrose NS. Fate of the inguinal hernia following removal of infected prosthetic mesh. Hernia 2006;58-61.
15. Cuschieri A, Steele RJC, Moosa AR. Hernia. In: Cuschieri A, Steele RJC, Moosa AR, eds. Essential surgical practice. 4th ed. London: Arnold, 2002:174-5.
16. Moon V, Chaudry GA, Choy C, Ferzli GS. Mesh infection in the era of laparoscopy. J Laparoendosc Adv Surg Tech A 2004;14:349-52.
17. Taylor EW, Duffy K, Lee K, Hill R, Noone A, Macintyre I, et al. Surgical site infection after groin hernia repair. Br J Surg 2004;91:105-11.
18. Saygun O, Agalar C, Aydinuraz K, Agalar F, Daphan C, Saygun M, et al. Gold and gold-palladium coated polypropylene grafts in a S. epidermidis wound infection model. J Surg Res 2006;131:73-9.
19. Iqbal P, Shaikh NA. Postoperative complications of inguinal hernia repair. Med Channel 2006;12:33-5.
20. Ueno T, Pickett LC, de la Fuente SG, Lawson DC, Pappas TN. Clinical application of porcine small intestinal submucosa in the management of infected or potentially contaminated abdominal defects. J Gastrointest Surg 2004;8:109-12.
21. Majeed S, Mehmood K. Repair of inguinal hernias with Lichtenstein technique. Pak Armed Forces Med J 2005;55:95-8.
22. Frazzetta M, Di Gesu G. Inguinal hernia surgery performed on elderly cardiopath patients. Acta Biomed Ateneo Parmense 2005;76(Suppl 1):42-5.
23. Farooq O, Bashir-ur-Rehman, Batool Z. Prolene Darn: safe and effective method for primary inguinal hernia repair. J Coll Physicians Surg Pak 2005;15:358-61.
24. Goldenberg A, Matone J, Marcondes W, Herbella FA, Farah JF. Comparative study of inflammatory response and adhesions formation after fixation of different meshes for inguinal hernia repair in rabbits. Acta Cir Bras 2005;20:347-52.
25 Baluch GMK. Inguinal hernia repair under local anaesthesia. J Surg Pak 2001;6:2-3.
26. Koukorou A, Lyon W, Rice J, Wattchow DA. Prospective randomized trial of polypropylene mesh compared with nylon darn in inguinal hernia repair. Br J Surg 2001;88:931-4.
27. Jan WA, Ghani A. Synthetic mesh repair of inguinal hernia under local anaesthesia. J Postgrad Med Inst 2001;15:157-60.
28. Jilani SA, Khan SA, Oonwala ZG. Inguinal hernia repair using mesh at Abbasi Shaheed Hospital. Pakistan J Surg 2000;16:22-4.
29. Bhopal FG, Zafarullah I, Khan JS, Iqbal M. Shouldice versus Lichtenstein hernia repair: Comparison of post-operative complications. Pakistan J Surg 2002;18:21-6.
30. Osuigwe AN, Ekwunife CN, Ihekowba CH. Use of prophylactic antibiotics in a paediatric day-case surgery at NAUTH, Nnewi, Nigeria: a randomized double-blinded study. Trop Doct 2006;36:42-4.
31. Terzi C, Kilic D, Unek T, Hosgorler F, Fuzun M, Ergor G. Single-dose oral ciprofloxacin compared with single-dose intravenous cefazolin for prophylaxis in inguinal hernia repair: a controlled randomized clinical study. J Hosp Infect 2005; 60: 340-7
32. Bay-Nielsen M, Nilsson E, Nordin P, Kehlet H, Swedish Hernia Database the Danish Hernia Database. Chronic pain after open mesh and sutured

repair of indirect inguinal hernia in young males. Br J Surg 2004;91:1372-6.
33. Mirza MKN, Hameed F, Sheikh MS, Bashir M. Ilioinguinal neurectomy in open inguinal hernia mesh repair. Ann KE Med Coll 2005;11:404-6.

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