Port Site Infection in Laparoscopic Surgeries


Abstract

Background/Aims: As the surgeries undertaken by laparoscope are increasing, complications are also increasing. In light of the explosive increase in laparoscopic surgery, there is concern about the effectiveness of sterilizing reusable laparoscopic instruments which might be a potential source of infection if not properly sterilized. Our study explains port site infection, its diagnosis and management with review of literature. Setting and Design: This study was carried out in a tertiary care setting and was an outcome study. Material and Methods: All five patients in the study were operated (April 2008-2010) elsewhere and came to us for management of non healing sinuses. Result: Amongst operated cases of laparoscopic cholecystectomy one healed by irrigation with superoxide, two cases healed with sinus exploration and wound debridement while one case required extensive wound debridement requiring temporary mesh repair of the abdominal wall with removal of the mesh (due to persistence of sinus) six months later following complete healing, no residual hernia. One operated case of laparoscopic incisional hernia repair with laparoscopic Cholecystectomy healed after removal of mesh with sinus exploration. Conclusion: The present study is an attempt to make surgeons aware about the complications which occur due to improper sterilisation of laparoscopic instruments ending into increased morbidity of patients.

Keywords

port site infection, non-healing sinus, ATT

Introduction

Laparoscopic surgery has now become a procedure of choice for most of surgeries in clinical practice. Minimally invasive surgical techniques have dramatically affected many surgical sub specialities, driven by advances in port access and video instrumentation and the desire to lessen incision pain and length of hospital stay. The total complication rate was 3.6/1000 procedures, and the rate of major complications was 1.4/1000 procedures. Recent study concluded that the currently prevalent practice of immersing laparoscopic instruments for 20 min in 2% alkaline glutaraldehyde should be re-examined. They recommend that the disinfectant solution used for sterilization was responsible for port site infection. The present study is an effort to study about the port site infection in laparoscopic surgery and its management. For prevention of infection, proper sterilization and storage of instruments is recommended. Laparoscopic port site infection is a preventable problem and can be effectively treated by combination of both surgical and nonsurgical method.

Material and Method

Five patients which were included in the study operated in the same town elsewhere. They came to us for further management of post laparoscopic non healing persistent sinus. Out of five patients four were the operated cases of laparoscopic cholecystectomy and one was of laparoscopic incisional hernia repair with laparoscopic cholecystectomy in the same sitting.

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After thorough clinical examination all patients were investigated by Gram’s & AFB staining, culture and sensitivity for aerobic and anaerobic bacteria, serology (IgG and IgA) for tuberculosis (ELISA), U.S.G and MRI of abdomen and the cause of port site infection was ascertained and the line of management was decided accordingly.

Case Scenario

- **Case [1]:** A 52 year female patient underwent laparoscopic cholecystectomy. The epigastric port site became inflamed and started discharging purulent fluid three weeks after the operation. When the wound refused to heal the patient was referred to us for further management about six weeks after the operation. Local examination revealed seropurulent fluid discharging sinus at epigastric port site with induration and pigmentation. USG Abdomen and X-ray chest, complete hematological and biochemical examination did not reveal any abnormality. Gram staining and culture & sensitivity swab discharge were sterile. Serum for IgG, IgA (Elisa) for tuberculosis were positive. The epigastric port site was explored and wound debridement was done. Antitubercular treatment was started. The wound healed within six weeks of ATT (Fig. 1). Patient was given full course of ATT for six months.

- **Case [2 & 3]:** A 35 year old female patient and another 50 year old woman underwent laparoscopic cholecystectomy at the same hospital. Both of the patients developed abscess formation at the epigastric port site four weeks after surgery. Incision and drainage was done by operating surgeon which led to nonhealing sinus at the epigastric port. After having full course of broad spectrum antibiotics patients came to us for persistent seropurulent discharging sinus from epigastric port site two months after surgery. All hematological, biochemical and imaging studies were found normal. Local examination revealed multiple discharging sinuses with pigmentation and induration at epigastrium involving whole of upper abdomen. Serum for IgG, IgA for tuberculosis was positive. A six month therapy of antitubercular drug was given with wound debridement. The wound healed within eight weeks of ATT.

- **Case [4]:** A 55 year old female underwent laparoscopic cholecystectomy and developed purulent discharge from the all the ports about two weeks after operation. Inspite of local wound care and multiple courses of various broad spectrum antibiotics and three months of ATT, sinuses refused to heal. The patient was referred to us for further management, eight months after surgery. Local examination revealed multiple sinuses, discharging purulent fluid at the epigastric, umbilical and right sub costal port-sites. There was pigmentation and induration at these sites. Routine haematological and biochemical investigations were normal. Gram’s staining; culture and sensitivity from the wound swab were sterile. As serum IgG and IgA were positive hence ATT was kept continued.

Exploration of sinus tracts under General Anaesthesia revealed multiple tracts interconnected to each other and having complete epithelial lining. These tracts were densely adherent to underlying sheath and excision of these tracts resulted in loss of most of the upper anterior rectus sheath hence an intra peritoneal mesh (Proceed Mesh) was placed and wound closed after thorough wound toilet. The wound healed well. About three weeks later patient restarted discharge from the puncture wounds of the sutures in epigastrium (Fig. 2). Inspite of regular
sinus tract irrigation with hydrogen peroxide, povidone iodine and “Oxum” (Superoxide), few sinus tracts still remained persistent. MRI of the anterior abdominal wall reveals collection of thick fluid in extra peritoneal area. Re-exploration, drainage of pus and removal of mesh was planned. After six months of conservative treatment exploration of sinuses were done and the mesh was removed en masse and wound was allowed to heal by secondary healing. Wound healed completely within 21 days without any significant complication or residual hernia (Fig. 3).

- **Case [5]:** A 35 year old female patient underwent laparoscopic incisional hernia repair along with cholecystectomy at another nursing home. About three weeks post-operatively patient developed purulent discharge from multiple port sites. When treatment from the operating surgeon could not result in healing of wounds, patient reported to us for further management, about six weeks after surgery. Local examination revealed multiple port sites discharging sinuses with pigmentation and induration in lower abdomen (Fig. 4). Hematological, biochemical & radiological examination does not reveal any abnormality. Culture and sensitivity and Gram’s staining from wound swab were sterile. Serum for IgG & IgA for tuberculosis was also negative. Irrigation of sinus tracts with hydrogen peroxide and povidone iodine and later on with “Superoxide” was done regularly. Even after twelve weeks of vigorous management by us two sinuses are still discharging purulent fluid though in lesser quantity. Exploration of sinus tracts and removal of mesh was done. Anatomical closure was done. Wound healed well without any significant complication.
Results

Amongst operated cases of laparoscopic cholecystectomy one healed by irrigation with superoxide, two cases healed with sinus exploration and wound debridement while one case required extensive wound debridement requiring temporary mesh repair of the abdominal wall. Although it had to be removed due to persistence of sinus six months later followed by complete healing without any residual hernia. One operated case of laparoscopic incisional hernia repair with laparoscopic Cholecystectomy healed after removal of mesh with sinus exploration. Serum IgG, IgA were positive in all four cases of laparoscopic cholecystectomy and negative in laparoscopic incisional hernia repair with laparoscopic cholecystectomy. All four sero-positive cases were also treated with ATT for six months.

Discussion

Laparoscopy has become procedure of choice for most of surgeries since it has advantage of smaller incision, which reduces pain and shortens recovery time, as well as resulting in less post-operative scarring but should be done in experienced hands with utmost care for sterilisation. A series of laparoscopy port site infections due to Mycobacterium chelonae were found in thirty five patients following laparoscopy at a single hospital over a six-week period. The contaminating source was ultimately identified as the rinsing water used for washing chemically disinfected instruments. Port site tuberculosis following laparoscopic cholecystectomy has also been reported in a study which concluded that the source of infection is usually a nosocomial with the laparoscopic instrument or its accessories. Sethi S. et al concluded that M. fortuitum is a clinically important nosocomial pathogen in patients who underwent laparoscopic tubectomies. Port site infection is also reported after laparoscopic appendicectomy by atypical mycobacterium and it was thought to be associated with dropped stones or at the site of physical injury following laparoscopic cholecystectomy. Amongst the port site epigastric port (88.2%) is affected more than umbilical port (11.7%). Wasim Memon et al reported that the causes of port site infection were gross spillage of infected bile, obesity and umbilical stitch sinus.

As far as our study is concerned all the hospitals from where patients came were using “Activated Dialdehyde” solution for sterilization of laparoscopic instruments; it may be a strong possibility that there might have been a growth of atypical mycobacteria in this solution, as four out of the five cases reported here found to be seropositive for tuberculosis. The three patients of laparoscopic cholecystectomy were operated during the span of one month only. So there is high possibility of using same solution for sterilization in all the three patients. K S Savita et al concluded that combined procedure in addition to the benefits of minimal access, patient gets the additional advantage of single hospital stay and single anaesthesia exposure but we strongly discourage the use of combined procedure specially if prosthetic material is being used in surgery. In case no.(4) an intraperitoneal mesh was placed to avoid incisional hernia as most of the upper abdominal wall sheath was excised during excision of the sinus tracts. Possibly it was the mesh which was responsible for persistence of sinus tracts. So it is recommended that in such cases excision of infected tissue should be done, wound should then be allowed to heal. Any resultant hernia should be repaired later on. The advantage of using mesh initially is that it leads to extensive fibrosis which ultimately prevents later hernia formation later which was seen in this case. She doesn’t develop incisional hernia even 1 year after removal of mesh. In case of laparoscopic cholecystectomy with laparoscopic incisional hernia repair with seronegative patient the cause might be migration of infection from concurrently done laparoscopic cholecystectomy, hence combined procedure should be done very cautiously.

There should be a novel approach for management of port site infection (Table 1). Firstly, the instruments should be thoroughly mechanically cleansed after each use, with complete dismantling of parts to ensure removal of all organic soil. This is best achieved by using an ultrasonic technology. Secondly, it is necessary to limit glutaraldehyde disinfectants and replace it with ethylene oxide gas sterilization, as this has been shown to be highly effective in reducing atypical mycobacterial infections following laparoscopy. A recent study has shown that atypical mycobacteria are showing increased resistance to these chemicals due to defects in porin expression in the bacterial cell walls. When liquid chemical sterilants are used, higher concentrations (3-4%) must be used and the exposure time should be increased to 8–12 hours to activate sporicidal activity. Furthermore, the water used to rinse the
instruments should be autoclaved to prevent recontamination with spores post sterilization or use disposable laparoscopic instruments. Finally, the practice of rinsing the instruments with boiled tap water to rinse off the glutaraldehyde, further limits the efficacy of use of this system of sterilization as it causes the re-introduction of mycobacterial spores on the instruments that are then deposited at the ports. Apart from tap water, the sharing of instruments between gynecological and urological practice, has been observed as another source of infection. Conventional autoclave can be used for sterilization of the metallic cannula of the ports. Instruments that enter sterile tissue, such as laparoscopes and hand instruments, are critical devices for which sterilization is an absolute requirement. High level disinfection that kills all microorganisms except bacterial endospores, is appropriate for only semi-critical devices, such as endoscopes which are used for GI endoscopy, and touch only the mucosa. The use of disposable laparoscopic instruments is the gold standard for prevention of infection. Thus proper sterilization of the laparoscope and instruments is of utmost importance in preventing infectious complications. Port site infection is a point of concern specially in developing countries which is preventable through proper sterilization of instruments and early clinical diagnosis and treatment.

### Conclusion

The present study is an attempt to make surgeons aware about the complications which occur due to improper sterilisation of laparoscopic instruments ending into increased morbidity of patients. It is imperative that the Cidex solution which is used for sterilization should be regularly changed and minimum immersion time should be more than 20 minutes after proper washing and cleaning of dismantled instruments under running water. Autoclaving and Ethylene oxide gas plant sterilization are more effective methods of sterilization. The only surgeon who does not encounter complications is one who is not operating. Complications can occur even in the best of hands and it is vital that these are recognised promptly and immediately addressed.

### References

4. Leo Francis Tauro, B. S. Satish Rao, John J. S. Martis,


