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EDITORIAL

Nontuberculous Mycobacteria in Port Site Infection Following Laparoscopic Surgery: Challenges for Doctors

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Laparoscopic surgery, also called "minimally invasive surgery," was developed in the 18th century and quickly became the preferred way to do many operations[1]. Philips Mouret reported the first laparoscopic cholecystectomy. Since then, the technique has been used and improved for many other surgeries. Laparoscopy has its own set of unique complications. Besides significant complications like bowel or vascular injury, Port site infection (PSI) caused by NTM is an infrequent but well-documented complication that can occur following laparoscopic surgeries. Depending on the reporting area and type of surgery, the PSI rate varies from 3.3% to 8%.

PSIs, based on the timing of their presentation, are classified into two categories: Early onset PSI (within a week of the surgical procedure) is often caused by Gram-positive or Gram-negative bacteria. Delayed or Late onset PSI (presents between three to four weeks after surgical procedure) is mainly caused by atypical mycobacteria[2]. Most outbreaks of NTM infections are caused by problems with sterilization, reuse of disposable devices without proper sterilization, and disinfection of reusable laparoscopes with 2% glutaraldehyde as a substitute for sterilization.

The most frequent NTM species responsible for skin/soft tissue infections are M. abscessus, M. fortuitum, M. marinum, M. ulcerans, and M. chelonae.Females are more likely to be affected. The exact reason for this is unknown, but it may be because laparoscopic procedures are more commonly done on women[3]. Identifiable comorbidities were rare, but diabetes mellitus and hepatitis B were identified as possible risk factors. NTM infections can affect one or more port sites, with the umbilical port being the most common one. Port-site NTM infections usually show up as nodule formation, pus pockets, wounds that won't heal, and subcutaneous nodules.

There are five clinical stages of the non-tuberculous or atypical mycobacterial port-site infection[4].

Stage 1: A small tender nodule near the port site.

Stage 2: Increase in size and tenderness with a sign of inflammation, a nodule, followed by discharge of white pus.

Stage 3: Reduced pain with continuously discharging sinus and necrosis of the overlying skin.

Stage 4: Chronic sinus with white or serous discharge.

Stage 5: Hyperpigmentation with necrosed skin and appearance of nodules at the other site.

The definitive diagnosis of NTM infections can be made by ZN staining of the pus, wound swab, or aspirated fluid. The sample should be simultaneously sent for NTM culture. The culture can be performed in solid egg-based (Lowenstein-Jensen), agar-based, or liquid medium (Middle brook). The bacterial growth will appear in two to five days of incubation for rapid growers, while slow growers may take two to eight weeks.The mycobacterial species can be identified by biochemical reactions, PCR, line probe assays, 16S

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or 23S ribosomal RNA DNA sequencing, or matrix-assisted laser desorption ionization-time of flight mass spectrometry. Pan-mycobacterial polymerase chain reaction (PCR) test can also be used for diagnosis.

Deep structures can be evaluated using ultrasound or computed tomography images, which can then be used to guide decisions about surgical excision or drainage.If surgical excision of the port site is performed, the tissue must be sent for histopathology and culture.

NTM are resistant to many antimicrobials. Hence, culture and sensitivity must be obtained whenever possible. As NTM shows a limited response to isoniazid, rifampicin, pyrazinamide, and ethambutol, DST should include additional drugs such as macrolides, quinolones, oxazolidinones, tetracyclines, and aminoglycosides, as well as broad spectrum beta lactam antibiotics. Susceptibility data suggest that several newer antibiotics (bedaquiline, linezolid, telithromycin, and tigecycline) may have activity against NTM. Still, their role in treatment remains to be defined. Current American Thoracic Society and Infectious Diseases Society of America (ATS/IDSA) guidelines recommend the use of combination therapy with different classes of agents, as rapidly growing NTM can develop resistance by mutation while on therapy. Inducible macrolide resistance has been demonstrated in M. fortuitum and M. abscessus.It is recommended to use a macrolide (clarithromycin or azithromycin) combined with parenteral medications such as amikacin, cefoxitin, or imipenem for skin and soft tissue infections caused by Mycobacterium abscesuss. In contrast, imipenem is preferred for M. chelonae, as it is uniformly resistant to cefoxitin.The suggested treatment for M. fortuitum infection is combination therapy with at least two active agents as guided by DST results. There is no consensus regarding the correct duration of therapy, except that prolonged treatment is required to prevent disease relapse. ATS/IDSA guidelines recommend a minimum of 4 months of therapy with at least two agents with in vitro activity.[5]

Although prolonged treatment with antimicrobial drugs alone can cure in some cases, good outcomes often require extensive debridement and removal of prosthetic material.Surgical debridement is reserved for cases with extensive tissue necrosis, abscess formation, or poor response to appropriate antimicrobial therapy.

In conclusion, NTM port site infection is a frustrating complication of laparoscopic surgery. Proper cleaning and sterilization of laparoscopic instruments and solutions used to disinfect the skin are essential to prevent infections. Most patients respond well to treatment. However, DST-guided multidrug regimens must be given for a long time.

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