

Research Article

Surgical Site Infection by Rapidly Growing Mycobacteria in a Tertiary Care Centre in India: A Retrospective Clinico - Microbiological Study

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An Atypical Mycobacteria /Non-tuberculous mycobacteria have emerged as opportunistic pathogen in the recent years, that can cause wide range of clinical syndrome in humans. Here ,we describe 22 cases of SSI(Surgical site infection) caused by atypical mycobacteria (rapid growers) during a period of 12 months (March 2012-April 2013). Non-healing post operative wound infection that did not respond to antibiotics used for pyogenic infection and had sterile routine aerobic cultures raised the suspicion of atypical mycobacteria. The study was done in a tertiary care cancer hospital of Eastern India over one year period which included SSI cases with delayed on set, not responding to antibiotics, following different types of surgery. Two wound swabs from 22 patients were collected and examined for isolation and identification of causative agents. Gram stain and Z-N stain and KOH preparation were used for direct examination. Culture media included BA, RCM, MA, LJ and SDA media. Isolates from the cases were identified using biochemical reactions and antimicrobial susceptibility testing was done by Kirby-Bauer's method. Mycobacterium fortuitum (12) and Mycobacterium abscessus (9) were isolated from 22 wound swabs. All the isolates were sensitive to Clarithromycin (96%), Amikacin (94.9%) and Imipenem (75%) but sensitivity were variable to Ciprofloxacin, Ofloxacin and Linezolid. All these infection were thought to be hospital acquired and proper measures were taken to prevent such infections.

Keywords: Surgical site infection, atypical mycobacteria, rapid growers. Infection control measures for prevention.

Introduction

Rapidly growing atypical mycobacteria are ubiquitous in nature particularly in water, soil etc. These are characterized by their growth in culture medium within 7 days of inoculation [1]. M.fortuitum,

M.abscessus and M.chelonae have emerged as important opportunistic human pathogens [2]. These emerging infections are increasingly important because of their association with surgical procedures [3]. Although they are not found as skin commensals loss of skin integrity is linked to infection [4]. Clinical manifestations include localized abscess formation, chronic ulcers, wound gaping, discharging sinuses etc. Wound infection do not occur as an immediate post-operative complications [5,6]. There is apparent immediate post operative healing and gradually over a variable period of time, the scar breaks down to a persistent non-healing superficial wound with discharging sinuses. In our study we also observed primary healing and patients reported of wound gaping and discharge between 15 days to 8 weeks post-operative. These wounds did not respond to antibiotics used in acute infection and persisted for prolonged period of time. The wounds were pain less and patients were afebrile with no other systemic illness. The frequency of nontuberculous mycobacterial infection is increasing worldwide [4]. In developed countries there is little or no standardized procedure for diagnosing non healing wounds by doing

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cultures. Sometimes these organisms are ignored as contaminants, so it is not possible to know the exact incidence of these infections [2]. Saroj Gupta Cancer Centre and Research Institute is a tertiary cancer hospital in Eastern India and caters to patients with both early and advanced malignancies. We report 22 cases of surgical-site infection with nontuberculous mycobacteria (Rapid growers) from non-healing wounds of different surgical cases.

Materials and Methods

The present study included 22 patients (20 female and 2 male aged 33-65 years) who had surgeries like total abdominal hysterectomy with ovariectomy, mastectomy, radical nephrectomy etc and developed wound gaping or discharges after 15 days to 8 weeks. These patients were not responding to usual antibiotics that were used for pyogenic infections.

Microbiological Investigations

Two wound swabs were collected from the wound site and processed for the identification of the causative agents. Gram, Z N, KOH stains were done for bacteria, mycobacteria and fungi respectively. Then the swabs were inoculated on Blood agar, MacConkey's Agar, Sabouraud Dextrose Agar, Lowenstein Jensen and Thioglycolate media for aerobic bacteria, fungi, mycobacteria and anaerobic bacteria. They were incubated at 37°C. LJ media were incubated at 25°C and 37°C the isolated organisms were identified as per the standard bacteriological techniques [7].

Antibiotic sensitivity testing was done by Kirby Bauer's method for Amikacin, Ciprofloxacin, Ofloxacin, Clarithromycin, Linezolid, Imipenem.

Results

Twenty-two patients of SSI with rapidly growing mycobacteria were identified. Majority of patients were females. 21 patients had culture confirmed rapid growers and also were AFB positive by ZN stain. One patient was smear positive but culture negative. Species identified were *M. fortuitum* and *M. abscessus*. Organisms were identified by standard criteria including growth rate, morphology and biochemical test results (table). All isolates analysed for antibiotic susceptibility tests were sensitive to Clarithromycin, Amikacin and Imipenem but showed variable susceptibility to Ciprofloxacin, Ofloxacin and linezolid. All patients were treated with Clarithromycin 500mg BD for 3 months and infections were healed totally except one patient who lost follow up. Since, these infections were hospital acquired. We took some measures for the prevention of such outbreaks as follows:

- A) Change of chemical agent for disinfection of Operation theaters.
- B) Use of sterile water for rinsing disinfected instruments.
- C) Use of multienzymes for cleaning of instruments
- D) Regular cleaning of overhead water tanks by bleaching powder.

Table 1:
Types of Microorganisms isolated from Samples collected
Total no. of sample positive for microorganism (n=22)
No. of sample positive for Mycobacteria =22
No. of sample positive for AFB by Z-N staining =22
No. of sample positive in AFB culture =21
Mycobacterium fortuitum—12
Mycobacterium abscessus—9
No. of sample positive for aerobic culture—0
No. of sample positive for anaerobic culture—0
No. of sample positive for fungal culture---0

Table: 2 Biochemical Tests To Identify Rapidly Growing Mycobacteria (RGM)

Test	M.fortuitum	M. abscessus
Growth rate	< 7 days	< 7 days
Growth at 25 ^o c	+	+
Growth at 37 ^o c	+	+
Nitrate reduction test	+	-
Catalase	+	+
Aryl sulfatase 3 days	+	+
Tolerance to 5% NaCl	+	+
Iron uptake	+	-
Beta glucosidase	+	-
Resistance to Capreomycin	+	-
MacConkey's agar	+	+
Penicillinase	-	+
Trehalose	-	+
Fructose	Acid	-

Discussion

Non tuberculous mycobacteria/rapid growers, usually do not cause mortality but they can cause morbidity, especially when they are not diagnosed and therefore not treated effectively. Non tuberculous mycobacteria were recognized soon after the discovery of Mycobacterium tuberculosis in the 19th century but those were not known as significant pathogens until the AIDS epidemic brought forth the drastic increase in opportunistic infections. Rapidly growing mycobacteria have been implicated as significant human pathogens in causing various infections in healthy and immunocompromised hosts. Most of the time these infections develop following intramuscular injections, surgery, superficial abrasions, penetrating trauma after exposure to contaminated disinfectants, soil or water. Postoperative wound infections caused by nontuberculous mycobacteria usually appear after few weeks to few months following surgery. In the immediate postoperative period, there is apparent healing of wounds, but over a variable period of time, the scar breaks down to a persistent non-healing superficial wound. A chronic non-healing wound may present a confusing picture and in such cases mycobacterial infection should be ruled out by appropriate investigations specially Z-N stain and mycobacterial culture. We had 22 cases which were smear positive for AFB. All were culture positive except one. The failure of growth in one sample may be due to inadequate pretreatment before sample collection. Rapid growers are usually resistant to rifampicin and Isoniazid (INH). These are usually sensitive to new generation macrolides, cephalosporins and aminoglycosides. Clarythromycin and a combination of amikacin and doxycycline have been seen to be effective against rapid growers. In our study, we used Tab

Clarythromycin 500mg twice a day. All these patients were treated with these drugs for 3 months after cessation of discharge from site to prevent recurrence. The source of infection in our case series is not clear. As per latest article by Maurer et.al. A number of sources could be the possible source of infection which include contaminated gentian violet, rinsing solutions, antiseptic solutions, injectable medications, unsterile surgical instruments or poor wound care, e.g. cleaning postoperative wound with tap water [8].

Conclusion

Surgeons and clinicians should be aware about these infections and strict sterilization protocols including cleaning and sterilization of surgical and medical equipments, proper skin preparation before operation and disinfection of operation theatre, all these are essential prerequisites to prevent these infections. Clinicians should always keep in mind about rapid growers in their differential diagnosis of surgical site infections especially when wounds do not respond to usual antibiotics and ordinary aerobic culture reports are negative.

Human and Animal Rights Informed Consent

This research does not contain any animal work. Informed consent for the publication of this report has been obtained from the patients.

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References

1. Gray TJ, Kong F, Jelfs P, Sintchenko V, Chen SC (2014) Improved identification of Rapidly growing Mycobacteria by a 16s-23s Internal Transcribed region PCR and capillary Gel Electrophoresis. PLOS one9(7): 1-8.
2. Kalita JB, Rahman H, Baruah KC (2005) Delayed postoperative wound infection due to nontuberculous mycobacterium. Indian J Med Res122: 535-539.
3. Uslan DZ, Kowalski TJ, Wengenack NL, Virk A, Wilson JW (2006) Skin and soft tissue infections due to Rapidly Growing Mycobacteria. Comparison of clinical features, treatment and susceptibility. Arch Dermatol 142: 1287-1292.
4. Macadam SA, Mehling BM, Fanning A, Dufton JA, Kowalewska-Grochowska KT, et al. (2007) Nontuberculous Mycobacterial breast implant infections. Plast. Reconstr.Surg. 119(1): 337-344.
5. Chadha R1, Grover M, Sharma A, Lakshmy A, Deb M, et al. (1998) An outbreak of post surgical wound infections due to Mycobacterium abscessus. Paed.Sur.Int13: 406-410.
6. Rodrigues C, Mehta A, Jha U, Bharucha M, Dastur FD, et al. (2001) Nosocomial Mycobacterium chelonae infection in laparoscopic surgery. Infect.Control.Hosp.Epidemiol 22: 474-475.
7. Koneman FW (1997) Mycobacteria. Diagnostic Microbiology 4^{ed}. Philadelphia: J.B. Lipincott Company: 703-56
8. Maurer F1, Castelberg C, von Braun A, Wolfensberger A, Bloemberg G, et al. (2014) Post surgical wound infections due to rapidly growing mycobacteria in Swiss medical tourists following cosmetic surgery in Latin America between 2012 and 2014. Euro Surveil 19(37): 1-4.