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Original Research Article.

A Raising Threat: Mycobacterium Tuberculosis & Non-Tuberculosis Mycobacterium Infection at Surgical Wound Site

Anil Avasthi[1], Aditya Mishra[2*]

[1]Assistant Professor, Dept. of Surgery, Mahatma Gandhi Medical College & Hospital, Jaipur, Rajasthan, India.
[2]Assistant Professor, Dept. of Microbiology, Mahatma Gandhi Medical College & Hospital, Jaipur, Rajasthan, India.

ABSTRACT

Objectives: To find out incidence of *Mycobacterium tuberculosis* & Non-Tubercular Mycobacterium infections at surgical wound site.

Materials and Methods: This study included 150 patients who had undergone surgery between March 2019 to February, 2020 at MGMCH & attached group of hospitals Jaipur. The patients developed delayed surgical site infections (2 weeks to 24 weeks after surgery) that were not responding to antibiotics and were sent RT PCR for MTB-NTM of tissue/Pus from wound.

Results: A total of 150 surgical site infected cases 32 were found positive with MTB infection and 7 cases were positive with NTM infection on MTB NTM PCR. Out of 7 NTM cases, 4 were *Mycobacterium fortuitum* and 2 cases were *M chelonae* & 1 cases of *M. ulcerans* were found.

Conclusion: Surgical site infection by tuberculosis and non-tubercular mycobacterium may be more common than diagnosed. Tuberculosis must be considered in wounds that show delayed, non-healing or recurrent surgical site infection with non-responding to antibiotics.

Keywords: MTB-NTM & SSI (Surgical Site Infection).

***Correspondence to:**

Dr. Aditya Mishra,
Assistant Professor,
Department of Microbiology,
Mahatma Gandhi Medical College & Hospital,
Jaipur, Rajasthan, India.

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INTRODUCTION

Tuberculosis (TB) remains a major global health problem and is the second leading cause of death from an infectious disease worldwide, after human immunodeficiency virus (HIV).[1] TB cases increase wherever there is poverty, crowding, and chronic debilitating illness. Similarly, elderly persons and patients with acquired immune deficiency syndrome (AIDS) are vulnerable. HIV infection, which prevails worldwide, has become the single most important risk factor for the development of TB.[2]

TB is an infectious disease caused by *Mycobacterium tuberculosis* (*M. tuberculosis*) that typically affects the lungs, but virtually any extrapulmonary organ can be involved by isolated TB. Overall, a relatively small proportion of people infected with *M. tuberculosis* develop TB. However, the probability of developing TB is much higher among those infected with HIV.[2]

Surgical site infection by *M. tuberculosis* is uncommon and its diagnosis can be missed unless there is strong clinical suspicion coupled with laboratory confirmation with the global resurgence of tuberculosis, there have been reports of unusual sites being affected by the disease. Mycobacteria associated with skin and soft tissue infections include *Mycobactrium marinum*, *M. ulcerans*, *M. fortuitum*, *M. chelonei*, *M. leprae*, and *M. tuberculosis* casing lupus vulgaris.[3] Although tuberculosis may involve any organ in the body but surgical site infection by *M. tuberculosis* is uncommon and, in most cases, is caused by reactivation of dormant tuberculosis, spread of the infection by either hematogenous route or direct inoculation from exterior or from a tuberculous abdominal lymph node or extension from underlying tubercular synovitis and osteomyelitis.[3]

Non-tuberculous mycobacteria (NTM), which include *Mycobacterium fortuitum* and *M chelonae* are rapidly growing mycobacteria, widely distributed in nature having been isolated from natural water, tap water, soil and water used in showers and surgical solutions.[4] They have been the cause of a variety of clinical presentations in cutaneous disease but rarely cause disseminated infections. The source of infection is frequently contamination of the wound, directly or indirectly with contaminated tap water. The most frequently reported infections are post-surgical, primary cutaneous and pulmonary.[5]

AIMS AND OBJECTIVES

To find out incidence of *Mycobacterium tuberculosis* & Non-Tuberculous Mycobacterial infections at surgical wound site.

MATERIALS AND METHODS

Study Centre: This study included 150 patients who had undergone surgery for various ailments between March 2019 to February 2020 at Mahatma Gandhi Medical College & Hospital, Jaipur.

Inclusion Criteria: Delayed surgical site infection cases were included in this study which was more than two weeks after the surgery.

Exclusion Criteria: Non-surgical site TB suspected cases were excluded in this study. and known TB positive cases were excluded in this study

Ethical Consideration: Permission for this study was obtained from the Institutional Ethics Committee.

Methodology: This study included 150 patients who had undergone surgery for various ailments between March 2019 to February, 2020 at Mahatma Gandhi Medical College & attached group of hospitals Jaipur.

The patients developed delayed surgical site infections (2 weeks to 24 weeks after surgery) and they were not responding to antibiotics and were sent for RT PCR for MTB-NTM of tissue from wound. The patients had undergone Appendicectomy (n=50), laparoscopic cholecystectomy (n = 40), Open cholecystectomy (n=30), Excision of keloid (n=10), Haemorrhoidectomy (n=10) and localized wound infection (n=10). Tissues from wounds were collected with sterile biopsy forceps/haemostatic forceps and after chemical fixation with 10% neutral buffered formalin the specimen was sent for histopathological examination. Pus/discharge from wounds was collected with the help of sterile cotton swabs and/or syringes and was sent immediately for culture and sensitivity test and for MTB-NTM PCR. Speciation of NTM was done on paraflim slide culture technique. For MTB-NTM PCR. DNA Extraction was done by Qiagen DNA Mini Kit and Amplification gene was targeted IS6110 while for NTM 16S rRNA gene were targeted.

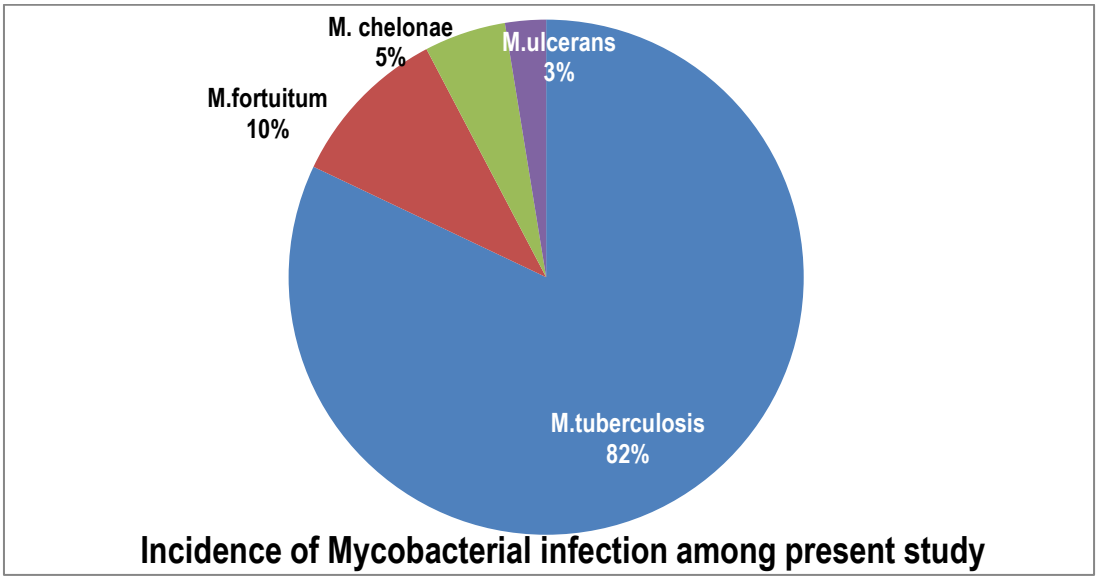

Fig. 1 Representation of Mycobacterium infection among SSI cases.

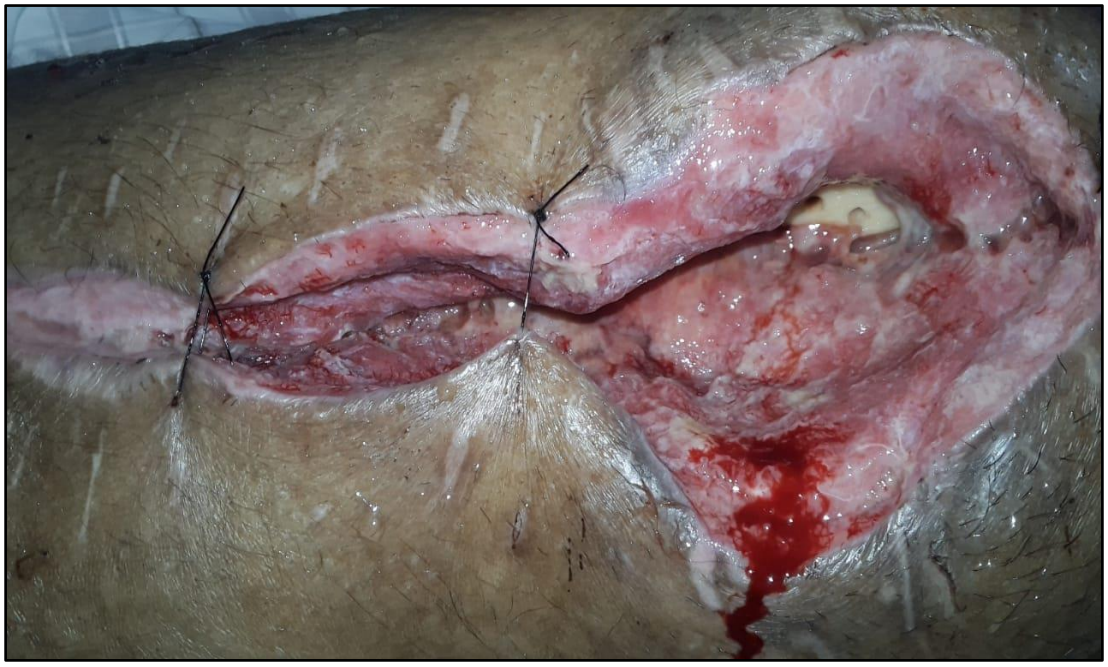

Image 1: Post-operative stitches inflamed with SSI.

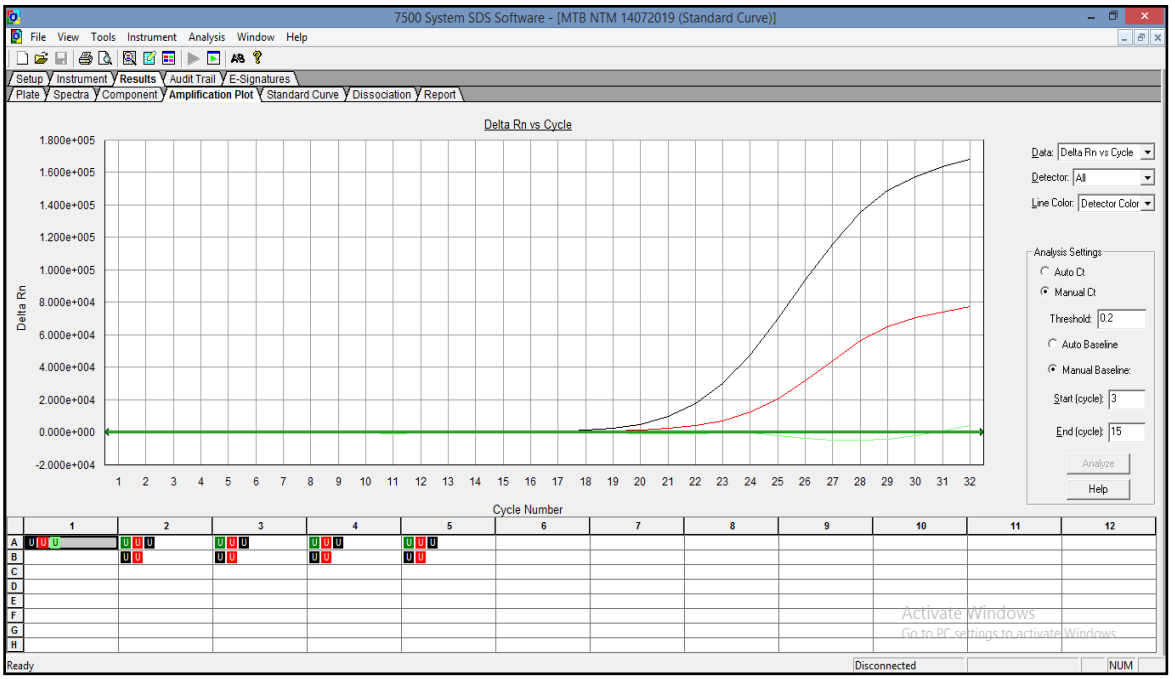

Image 2: Mycobacterium tuberculosis positive result on RT PCR

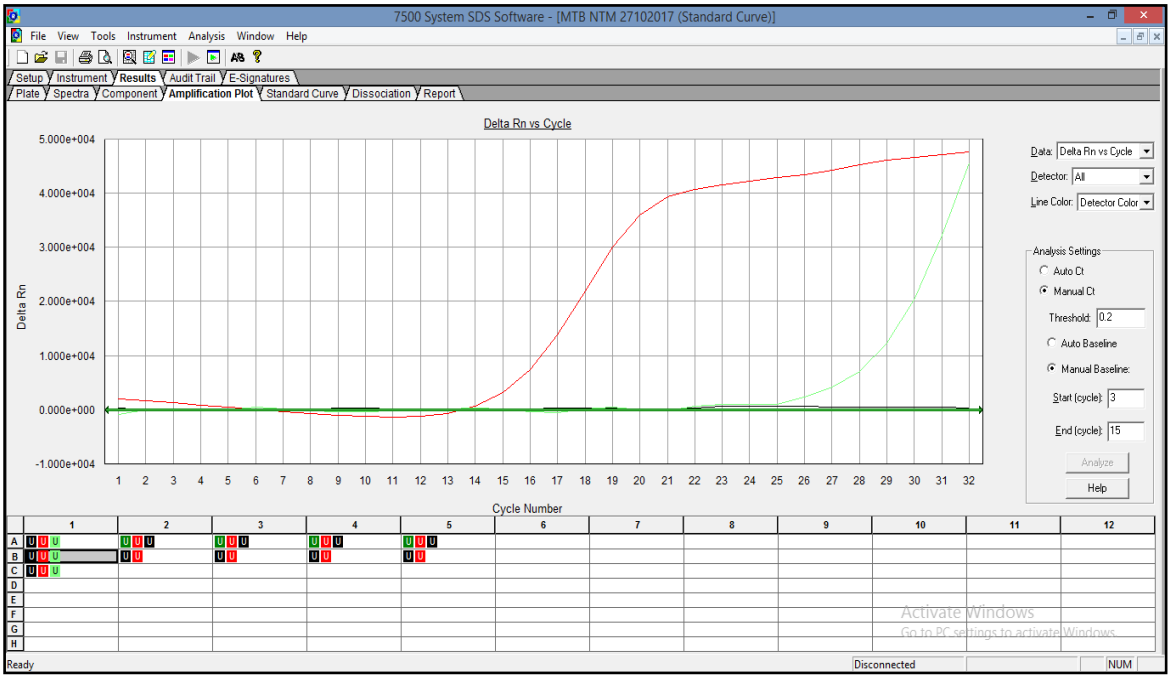

Image 3: NTM positive result on RT PCR

RESULTS

A total of 150 surgical site infected cases 32 were found positive with mycobacterium tuberculosis infection and 7 cases were positive with non-tubercular mycobacterium infection on MTB NTM PCR. Out of 7 NTM cases, 4 were found *Mycobacterium fortuitum* and 2 cases were positive with *M chelonae* & 1 cases of *M. ulcerans* were found. (Fig.1, Image-2 &3) Out of 39 MTB NTM positive cases 28 (71.8%) were males and 11 (28.2%) were females.

DISCUSSION

A total of 150 patients with delayed surgical site infections were included in this study. All patients had similar presentations such as appearance of erythema along with breakdown of scar and suppuration, inflamed sinuses, and recurrent tiny stitch abscess formation, in absence of systemic manifestations and no sign of improvement with traditional antibiotics and regular dressing.[6] All patients had no clinical symptoms of tuberculosis, no past history of tuberculosis and none had been contact with any patients of tuberculosis. So the diagnosis and initiation of treatment was delayed until confirmation by PCR.

Among the 150 patients, 32 patients' wound tissues histopathologically showed granulomatous inflammation and epithelioid cells that consistent with MTB & NTM which is further confirmed by RT-PCR. The remaining showed non-specific, chronic inflammation and foreign body granuloma. 9 of the 150 patients' wound swab revealed growth of NTM, remaining were

negative. NTM identification was done by paraflim side culture technique and speciation was done on the basis of biochemical tests. In routine blood tests, all patients revealed hematological normal Chest X-Rays were negative for all cases.

Distribution of MTB/NTM and incidence of disease caused by them is not fully understood.[6] Recently *M fortuitum* and *M chelonae* have been reported as a cause of abscesses and post-surgical wound infections.[7] In our study the post-operative wounds in all the cases had initially healed satisfactorily after surgery. Only after a period of 12-28 days they became erythematous and started discharging pus in small quantity which later turned copious. These wounds were not responded to antibiotics and persisted for long time. Typically wound infections due to NTM do not occur as an immediate post-operative complication but take some time to make their clinical appearance, when the operation scar breaks down and a non-healing superficial ulcer develops with discharging sinus.[7-10] Sethi et al reported 7 patients with *M fortuitum* infections post laproscopic tubectomies.[11] Development of mild discomfort, induration, with/without local pain, swelling and serosanguineous discharge from a minute opening over the operated scar for past 2-3 weeks, heralds the onset of the infection. Aspirate specimens in such cases show no organism on Gram stain and cultures are sterile for aerobic and anaerobic organisms. Hence, all such sterile specimens must be sent for MTB=NTM PCR.[12-15]

CONCLUSION

Surgical site infection by tuberculosis and non-tubercular mycobacterium may be more common than diagnosed. Tuberculosis must be considered in wounds that show delayed, non-healing or recurrent surgical site infection with non-responding to antibiotics.

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