

Lower Limb Stump Infection Management among Rural North Indian Population

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ABSTRACT

Introduction: In India, the most common complication of lower limb amputated stump is infection, and it accounts 53.5% of total amputation. The published studies on prevention and management of such infection are very few.

Materials and methods: All the patients presenting with infection of amputated lower limb stump between 2010 and 2015 were included in this descriptive study. Diagnosis was confirmed by clinical, hematological, radiological, and microbiological test, i.e., culture and sensitivity of wound. Based on sensitivity report, treatment was started.

Result: There were 62 patients with 80 amputated lower limb stump infections. The most common presentation was sinus tract (54.8%). The most common cultured pathogen was *Pseudomonas aeruginosa* (39%). The most sensitive antibiotic was Piperacillin + Tazobactam (82.25%), followed by imipenem (75%), and levofloxacin (58.75%).

Conclusion: More than 60% of Indian population lives in rural area. The primary mode of healthcare services in India is peripheral health centers. The first choice of drug therapy in management of amputated lower limb stump infection can be levofloxacin.

Keywords: First-line drug therapy, Levofloxacin, Lower limb amputated stump infection.

Indian Journal of Physical Medicine & Rehabilitation (2019); 10.5005/jp-journals-10066-0054

INTRODUCTION

In the global population, estimated prevalence of limb amputations is 0.7%.¹ An amputated stump infection leads not only to additional healthcare costs and poor quality of life but also adds significant morbidity to the patient.² Thirteen to forty percent wound infections occur following major lower limb amputation.³ The most common complication of lower limb amputated stump is infection, and it accounts 53.5% of total amputation in Chhattisgarh.⁴ Twenty-five percent of wound infection following major lower limb amputation requires revision amputation.⁵ The published studies on prevention and management of such infection are very few; hence, this observational study was carried out in Dept. of Physical Medicine and Rehabilitation at King George's Medical University, Lucknow, with the objective (i) to find most common presentation of infection, (ii) to find most common pathogen, (iii) to find most sensitive antibiotic, and (iv) to select most appropriate first-line antibiotic for lower limb amputated stump infection management.

MATERIALS AND METHODS

The treatment records of all the patients from the Department of Physical Medicine and Rehabilitation at King George's Medical University, Lucknow, with lower limb amputated stump infection were analyzed for recording relevant information for the said objectives from January 2010 to December 2015, and this observational study was performed. This study included all the treated patients for amputated lower limb stump infection from January 2010 to December 2015.

Sonologically confirmed extensive inflammation or muscular or a subcutaneous abscess was defined as a soft tissue infection.⁶ On physical examination, if we achieved a bony contact with a sterile metal probe and we get anomalies in X-ray and/or CT scan, osteomyelitis was suspected.⁷

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How to cite this article: Mishra S, Kumar DK, Gupta AK, *et al.* Lower Limb Stump Infection Management among Rural North Indian Population. *Indian J Phys Med Rehab* 2019;30(3):66-68.

Source of support: King George's Medical University, Lucknow, Uttar Pradesh, India

Conflict of interest: None

In this study, diagnosis was confirmed by clinical, hematological, radiological, and microbiological test, i.e., culture and sensitivity of wound. Sample collection was done by open wound swab method and by needle aspiration method from discharging sinus. X-ray of stump was done to see bony changes, and the extent of sinus or abscess cavity was determined by sonographic imaging.

Sensitivity of all the stump were tested for 14 antibiotics, namely, ampicillin, amoxiclav, piperacillin + tazobactam, cephalixin, ceftriaxone, ceftazidime, cefepime, cefoperazone + sulbactam, imipenem, gentamicin, amikacin, ciprofloxacin, levofloxacin, and gatifloxacin. The most sensitive antibiotic was selected for treatment of infection. Stump infection in the form of open wound was treated by regular dressing and course of antibiotics. Stump infection in the form of discharging sinus was treated by course of intravenous antibiotic, surgical debridement, followed by oral antibiotics. Stump infection in the form of osteomyelitis was treated with course of intravenous antibiotic, surgical excision of infected bone, followed by oral antibiotics.

Correction of all hematological inflammatory markers and abolition of radiological sign of infection was considered as complete cure from infection and indication to stop drug.

RESULT

There were 62 patients (44 unilateral and 18 bilateral) with 80 lower limb amputated stump infection of which 48 (77.4%) were male and 14 (22.6%) were female, with male to female ratio of 3.4:1. The mean age of presentation was 30 years (range: 2–60 years). Cause of primary amputation was traumatic in 43 limbs (54.8%), infection in 14 limbs (17.5%), peripheral vascular disease in 10 limbs (12.5%), leprosy in 8 limbs (10%), and malignancy in 5 limbs (6.3%).

The level of amputation was transfemoral in 29 limbs (36.6%), transtibial in 38 limbs (47.5%), at knee disarticulation in 6 limbs (7.5%), and at ankle disarticulation in 7 limbs (8.8%). The most common presentation of lower limb amputated stump infection was the presence of sinus tract, which was observed in 43 limbs (54.8%). Other signs of infection were ulceration in 20 limbs (25%),

abscess in 12 limbs (15%), and pain during the prosthetic fitting in 5 limbs (6.3%) at the initial evaluation.

On radiological examinations, X-ray of all the stumps showed bony spur in 32 stumps and changes of osteomyelitis in 11 stumps. Sinography of discharging sinus showed soft tissue infection in 32 stumps.

Microbiological culture showed six types of pathogens, namely, *Pseudomonas aeruginosa*, *Escherichia coli*, *Staphylococcus aureus*, *Acinobacter*, *Proteus*, and *Klebsiella* of which the most common cultured pathogen was *P. aeruginosa* (39%) (Fig. 1). Sensitivity testing with all the 14 drugs showed Piperacillin + Tazobactam the most sensitive antibiotic followed by imipenem and levofloxacin (Fig. 2). Piperacillin + Tazobactam was found sensitive against all pathogen with 81.25% sensitivity. Imipenem was found sensitive against all pathogens except *Staphylococcus aureus* with 75 % sensitivity. Levofloxacin was found sensitive against all pathogens except *Klebsiella* with 58.75% sensitivity.

DISCUSSION

The published studies on prevention and management of such lower limb amputated stump infection are very few. Most of these patients required antibiotic treatment, some may require surgical procedure in the form of necrotic soft tissues excision, and very few cases require infected bone resection in addition to traditional therapy.

The most frequent clinical sign of chronic infection is presence of a nonhealing discharging sinus tract as in this study.⁸ For early detection soft tissue abscess and sample collection for microbiologic culture, ultrasonography can be used, but CT scan with or without sinography is very sensitive to detect soft tissue as well as bony infection and guide for surgical decision; thus, diagnostic radiology plays a vital role in management of stump infection.⁹ In this study, only X-ray of stump and sinography were used as radiological parameters due to poor financial condition of the patients.

In lower limb infections, *Staphylococcus* is the most frequent isolated bacteria,¹⁰ but in traumatic lower limb amputated stump

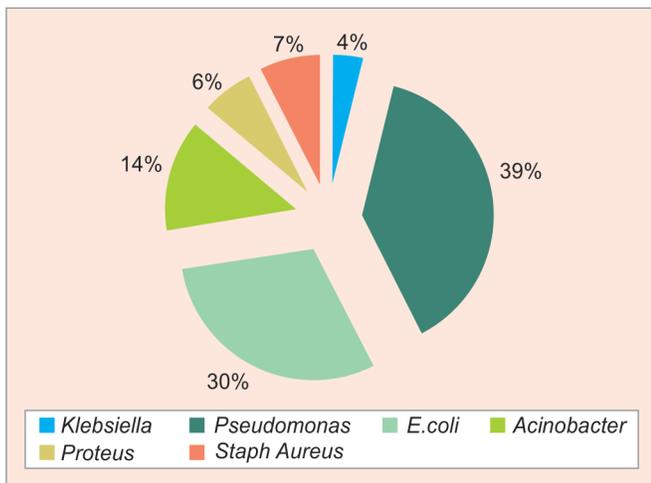


Fig. 1: Cultured pathogen

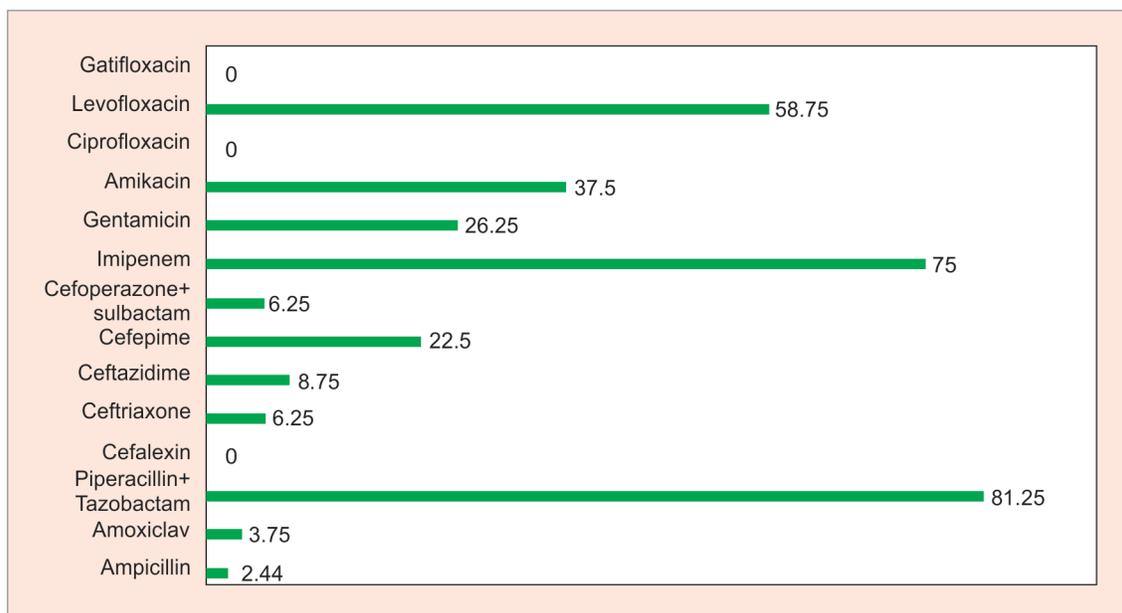


Fig. 2: Percentage sensitivity of drugs

infection, the most frequent isolated bacteria is *P. aeruginosa* as a consequence of telluric contamination.¹¹ Similarly, in this study, the most common isolated bacteria from lower limb amputated stump infection was *P. aeruginosa*, and the most common cause of lower limb amputation was trauma.

The published studies about post amputation antibiotic therapy are very few. Antibiotics play vital role in prevention and control of lower limb amputated stump infection.² In this study, the most sensitive antibiotic was Piperacillin + Tazobactam, followed by imipenem, and levofloxacin. When we compare all the three drugs, Piperacillin + Tazobactam and Imipenem have following drawbacks: they are costly, not freely available, administered only by intravenous route, and require monitoring, whereas levofloxacin is cost effective and freely available even in rural part of India, available in both oral and infusion formulation.

More than 60% of Indian population lives in rural area, where the only mode of primary healthcare services are peripheral health centers. In such conditions, neither Piperacillin + Tazobactam nor Imipenem can be considered as the first choice of drug therapy in cases of lower limb amputated stump infection management. In such situation, levofloxacin can be started even on outdoor basis till the availability of culture and sensitivity report in lower limb amputated stump infection management.

CONCLUSION

More than 60% of Indian population lives in rural area. The primary mode of healthcare services in India is peripheral health centers. The first choice of drug therapy in management of amputated lower-limb stump infection can be levofloxacin.

TAKE-HOME MESSAGE

While managing any infection, ideally, it is recommended to select antibiotic based on culture and sensitivity report, but as per this study, one can start levofloxacin as primary drug therapy till the availability of culture sensitivity report in lower limb amputated stump infection.

ACKNOWLEDGMENTS

The entire staff member working in the Department of Physical Medicine and Rehabilitation at KGMU.

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