

Original Research

Assessment of duration of antibiotic and infection rates in post primary TKA

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ABSTRACT:

Background: Infection associated with total knee arthroplasty (TKA) occurs in 0.5–2% of patients during the first 2 years following primary knee replacement. The present study was conducted to assess duration of antibiotic and infection rates in post primary TKA. **Materials & Methods:** 102 patients of TKA of both genders were enrolled. TKA-associated infection was diagnosed. Antimicrobial agent was given for a total duration of > 6 months with initial intravenous administration for > 2 weeks. **Results:** Out of 102 patients, males were 62 and females were 40. Infection was first infection in 94 and re-infection in 8. Type of infection was early in 46, delayed in 22 and late in 34. It was Haematogenous in 47 and Exogenous in 65. Common pathogens were staphylococcus aureus in 45%, coagulase-negative staphylococci in 26%, streptococcus spp. in 18%, Escherichia coli in 7%, Pseudomonas aeruginosa in 4% and no growth in 3%. Appropriateness of antimicrobial treatment was adequate in 64%, partially adequate in 32% and inadequate in 4%. **Conclusion:** Antibiotic treatment in TKA patients found to be effective in reducing infection.

Key words: Antimicrobial agent, staphylococcus, total knee arthroplasty

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INTRODUCTION

Infection associated with total knee arthroplasty (TKA) occurs in 0.5–2% of patients during the first 2 years following primary knee replacement. Treatment of such infections costs three-to four times more than the primary arthroplasty itself. Treatment options can be classified into prosthesis retention, prosthesis exchange and salvage procedures (arthrodesis or amputation). The goal of therapy is eradication of infection, resulting in a pain-free, functional joint.¹

Treatment of infection may be associated with numerous challenges, including the need for multiple operations, longer hospitalization, higher incidence of morbidity and mortality, and increased cost.² Although implementation of various strategies such as the administration of prophylactic antibiotics has reduced the incidence of infection after primary arthroplasty to approximately 1% to 2%, orthopaedic surgeons encounter this complication on a frequent basis. Infection after revision surgery occurs even more frequently and poses a complex problem.³

Debridement with retention (combined with appropriate antimicrobial therapy), one-stage exchange and two-stage exchange are the three procedures which have the potential to achieve the above goal⁴. Since controlled trials comparing these different surgical options are lacking, and will probably never be performed, the choice of the optimal treatment is still a matter of debate. Intraosseous antibiotic infusion through a tibial cannula after tourniquet inflation and before surgical incision was proposed as an alternative route for prophylactic antibiotic administration.⁵ The present study was conducted to assess duration of antibiotic and infection rates in post primary TKA.

MATERIALS & METHODS

The present study comprised of 102 patients of TKA of both genders. They were enrolled with the written informed consent.

Data pertaining to patients such as name, age, gender etc. was recorded. TKA-associated infection was

diagnosed if a sinus tract communicating with the joint space was present or if at least two of the following criteria were present: (1) at least one positive intra-operative tissue or synovial fluid culture; (2) > 5 neutrophils per high-power field in peri-prosthetic tissue specimens; (3) > 1700 leukocytes/IL and/or > 65% neutrophils in synovial

fluid [20]; (4) clinical and laboratory signs of infection. Antimicrobial agent was given for a total duration of > 6 months with initial intravenous administration for > 2 weeks, use of appropriate drugs according to antimicrobial susceptibilities. Results thus obtained were subjected to statistical analysis. P value less than 0.05 was considered significant.

RESULTS

Table I Distribution of patients

Total- 102		
Gender	Males	Females
Number	62	40

Table I shows that out of 102 patients, males were 62 and females were 40.

Table II Patients characteristics

Characteristics	Number	P value
Infection		
First Infection	94	0.01
Re- Infection	8	
Type of Infection		
Early	46	0.05
Delayed	22	
Late	34	
Type of infection		
Haematogenous	47	0.04
Exogenous	65	

Table II shows that infection was first infection in 94 and re- Infection in 8. Type of infection was early in 46, delayed in 22 and late in 34. It was Haematogenous in 47 and Exogenous in 65. The difference was significant (P< 0.05).

Table III Pathogens isolated from cases

Pathogens	Percentage	P value
Staphylococcus aureus	45%	0.02
Coagulase-negative staphylococci	26%	
Streptococcus spp.	18%	
Escherichia coli	7%	
Pseudomonas aeruginosa	4%	
No growth	3%	

Table III, graph I shows that common pathogens was staphylococcus aureus in 45%, coagulase-negative staphylococci in 26%, streptococcus spp. in 18%, Escherichia coli in 7%, Pseudomonas aeruginosa in 4% and no growth in 3%. The difference was significant (P< 0.05).

Graph I Pathogens isolated from cases

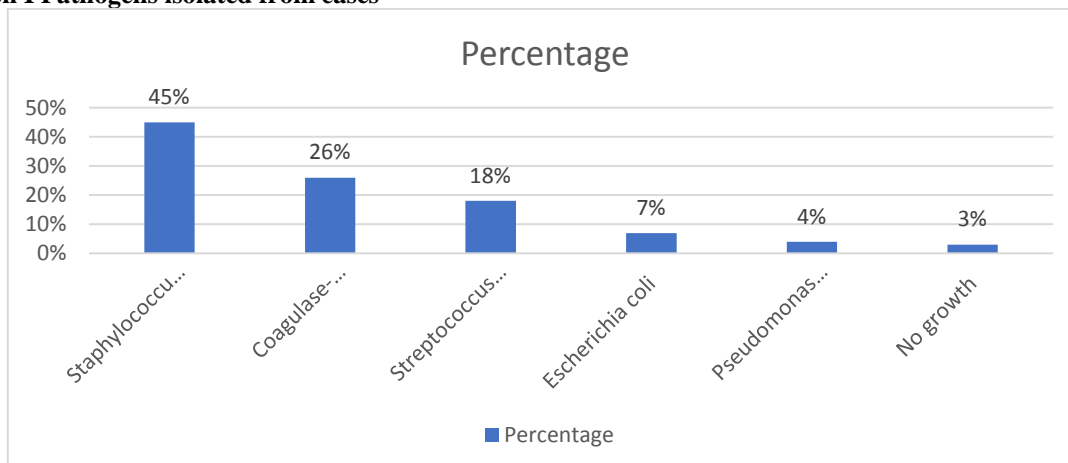


Table IV Outcome of antimicrobial therapy

Outcome	Success rate (%)	P value
Appropriateness of antimicrobial treatment		
Adequate	64%	0.03
Partially adequate	32%	
Inadequate	4%	

Table IV shows that appropriateness of antimicrobial treatment was adequate in 64%, partially adequate in 32% and inadequate in 4%. The difference was significant ($P < 0.05$).

DISCUSSION

Periprosthetic joint infection is a concerning surgical complication because of its challenging management and considerable likelihood of becoming a disabling chronic condition. Nevertheless, our knowledge in many aspects of PJI still needs to be broadened.⁶ This is reflected by the existence of many controversial issues in different aspects of PJI management and is the reason why PJI continues to be a hot topic for investigation. PJI has a major impact on many aspects of life of the suffering patients including their physical and emotional health as well as family and social relationships.⁷ The risk factors for periprosthetic joint infection after primary knee arthroplasty include male gender, rheumatoid arthritis, previous fracture around the knee, and wound-related complications. However, risk factors after revision arthroplasty are unclear and it is not known if those for patients undergoing primary TKA also apply to those having revision arthroplasty.⁸ The incidence varies from 0% to 10%. The reason for these variations relates to multiple factors, including the definition of infection, the type of cohort included, sample size, and the duration of follow up.⁹ In light of the high economic impact and increasing number of infected revisions, better knowledge of modifiable factors that make TKA revisions vulnerable to infection might help guide clinical practice in the treatment and prevention of this complication.¹⁰ The present study was conducted to assess duration of antibiotic and infection rates in post primary TKA.

In present study, out of 102 patients, males were 62 and females were 40. Laffer et al¹¹ compared the long-term success of different surgical strategies in prosthetic knee associated infection performed in 40 episodes in 35 consecutive patients undergoing revision surgery for prosthetic knee-associated infection at a single centre between 1988 and 2003. The median patient age was 70 (44–90) years; the median follow-up period was 28 (2–193) months; 45% of infections were early, 23% were delayed, and 32% were late; and 55% of infections were caused by staphylococci. The probability of survival without prosthesis failure was 92.4% (95% CI, 84.1–100) after 1 year, and 88.7% (95% CI, 78–99.4) after 2 years. Recurrence-free survival was observed in 20 (95%) of 21 patients treated with debridement and retention, in both patients with one-stage exchange, and in 11 (85%) of 13 patients with two-stage exchange. Patients with delayed infection had a worse outcome than those with early or late infection (67% vs. 97%; p

< 0.03). Patients with at least partially adequate antimicrobial therapy had a higher success rate than those with inadequate treatment (94% vs. 60%; p 0.069). The outcome was similar for patients with a duration of therapy of 3 to < 6 months, and those with a duration of therapy of ≥ 6 months (91% vs. 87% success). Different surgical procedures had similar success rates, provided that the type of infection, the pathogen, the stability of the implant and the local skin and soft-tissue condition were considered. Adherence to an algorithm defining a rational surgical and antibiotic treatment strategy contributed to a favourable outcome

We observed that infection was first infection in 94 and re- Infection in 8. Type of infection was early in 46, delayed in 22 and late in 34. It was Haematogenous in 47 and Exogenous in 65. We observed that common pathogens was staphylococcus aureus in 45%, coagulase-negative staphylococci in 26%, streptococcus spp. in 18%, Escherichia coli in 7%, Pseudomonas aeruginosa in 4% and no growth in 3%. We found that appropriateness of antimicrobial treatment was adequate in 64%, partially adequate in 32% and inadequate in 4%. Mortazavi et al¹² retrospectively reviewed 475 patients (476 knees) with 499 TKA revisions performed between March 1998 and December 2005. Of the 476 knees, 91 (19%) were revised for infection and 385 (81%) were revised for aseptic failure. Preoperative history, results of physical examinations, laboratory and radiographic results, joint fluid aspiration results along with analysis of intraoperative findings were all considered to make an assessment of septic versus aseptic failure modes. Patients were followed for a minimum of 25 months (mean, 65 months; range, 25–159 months). Deep infection developed in 44 of the 476 knees (9%). The infection rate was higher in patients undergoing revision for infection than in patients with aseptic revisions: 21% (23 of 91) and 5% (21 of 385), respectively. Revision for infection, higher Charlson index, and diagnosis other than osteoarthritis at the time of primary TKA predicted infection of the revision. The risk of infection for patients undergoing TKA revisions was 10-fold higher than for patients undergoing primary TKA.

CONCLUSION

Authors found that antibiotic treatment in TKA patients found to be effective in reducing infection.

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