

# The Incidence of Post-operative Wound Infection in Orthopaedic Surgery

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## Summary

With the increase in the number of orthopaedic surgeons and the aggressive marketing by manufacturing companies, high technology orthopaedic surgery is being more frequently carried out in Malaysia. Post-operative sepsis complicating this type of surgery can have disastrous consequences. No data is available in this country on the incidence of post-operative infection in Orthopaedic Surgery. The aim of this study was to determine the incidence of post-operative infection. A retrospective survey of 703 patients undergoing elective Orthopaedic Surgery in the year 1991 was carried out. We found an overall post-operative infection rate of 6.8% and a deep infection rate of 3.3%.

This figure of 3.3% is higher than the internationally accepted figure of less than 2%. A need for ongoing surveillance and concerted effort to reduce the infection rate is stressed.

*Key Words:* ?????

## Introduction

With the increase in the number of orthopaedic surgeons in Malaysia and the aggressive marketing by manufacturing companies, high technology orthopaedic surgery is being more frequently carried out in this country. This is especially true of implant surgery i.e. joint replacement and internal fixation of spine and fracture of the long bones. Post operative sepsis complicating this type of surgery can have disastrous consequences. No data is available in this country on the incidence of infection after orthopaedic surgery in general and implant surgery in particular. Most surgeons often quote the very low incidence reported by the excellent orthopaedic centres in the West. We are well aware of the wide variations in the operating environments in different hospitals around the world and within our country. Hence a wide variation in the infection rate is to be

expected. A zero infection rate is the ideal for elective orthopaedic surgery, though it appears unattainable at present. Most orthopaedic centres now report an incidence of lower than 2%<sup>1,2</sup>.

Centres embarking on high technology surgery should be aware of their own infection rate to reduce potentially serious complications which are very expensive to treat. The aim of this study is to find out the incidence of post-operative infection of clean wounds in Orthopaedic Surgery at the University Hospital, Kuala Lumpur.

## Methods

This retrospective survey involved obtaining the case records of patients who underwent elective surgery by the staff of orthopaedic department in the year 1991. Out of a total of 720 cases, 703 case folders with

adequate information were available. The following information was collected and the data entered into a computer.

- (1) Age of patient
- (2) Diagnosis
- (3) Nature of operation
- (4) Prophylactic antibiotic used
- (5) Name of surgeon
- (6) Presence or absence of infection

We defined infection as superficial if there was erythema and induration of the wound with or without mild fever and slight wound discharge which resolved with local wound care, with or without antibiotic therapy for about 7-10 days. Deep infection was defined to be present if there was serous or purulent drainage necessitating prolonged use of antibiotic (more than two weeks) and/or needed reoperation for drainage or removal of the implant (because of infection) at the same or any subsequent admission. Only patients with clean wounds by definition<sup>3</sup> were included in this study.

## Results

### Overall infection rate of wounds

Of the 703 wounds studied, 48 became infected giving an overall infection rate of 6.83%. Of these 48 infected wounds, 25 were superficial and 23 were deep infections, giving an infection rate of 3.56% and 3.27% respectively.

### Deep infection rate in different surgical procedures ( Table I )

Table I shows the breakdown of the infection rates for different surgical procedures which varies from 0-9%. The lowest infection rate was seen in soft tissue surgery which included operation on muscles, tendons, ligaments, arthroscopy, meniscectomy etc. where one infection occurred in 145 operations. Other soft tissue operations like excision of lipoma, ganglion, carpal tunnel release etc. had no infection. Of the internal fixation procedures, K-nailing had the lowest infection rate of 2.2% and plating of long bones had a 4.5% infection rate. Arthrodesis had the highest infection rate (9%) with one infection out of 11. This is artificially high compared to other

operations probably because of the small number of cases involved.

Arthroplasty, spinal surgery and osteotomies had very similar infection rates averaging 4.5%. The average infection rate for operations involving the bone was 4.2%.

**Table I**  
**Deep infection rate in different surgical procedures**

Surgical Procedure	No. of patients	No. of deep infections	Infection rate
1. Arthroplasty	85	4	4.7%
- Total joint	51	2	3.9%
- Hemiarthroplasty	34	2	5.8%
2. Spinal Surgery	64	3	4.68%
3. Osteotomies	23	1	4.35%
4. Internal Fixation	337	13	3.8%
- K nailing	90	2	2.2%
- Plating	131	6	4.58%
- Others	116	5	4.31%
5. Arthrodesis	11	1	9%
6. Soft Tissue Surgery	145	1	0.68%
7. Others	38	0	0%

### Infection rate and the surgeon ( Table II )

Cases operated on by consultants had the highest infection rate of 4.9%. Cases done by lecturers had an infection rate of 3.7% while cases operated by medical officers had no deep infection.

Consultants performed 17% of all operations and 55% of these operations were spinal and joint replacement surgery. Lecturers performed 66% of all surgeries. Of these 52% were internal fixation and 22% were soft tissue operations. Medical officers performed 17% of the total surgeries and 76% of these were internal fixations of fractures, which were usually simple and uncomplicated.

The variation of infection rates of individual surgeons was very wide but no conclusions can be reached because the number of cases operated on by each surgeon was small.

**Table II**  
Infection rate and the surgeon

Surgeon	No. of operations	No. of deep infections	Infection rate
Consultants	122	6	4.9%
Lecturers	462	17	3.7%
Medical Officers	119	0	0%

#### Deep infection rate and use of prophylactic antibiotics

A total of 329 patients had no prophylactic antibiotics whereas 374 patients had prophylactic antibiotics. The group receiving no antibiotics had a 2.4% deep infection rate (8 out of 329 patients) while the group with prophylactic antibiotic had a 4% deep infection rate (15 out of 374 patients). However in the non-antibiotic group 50% of the operations were on soft tissues and 35% were internal fixations of fractures. In the antibiotic group 59% of the operations were internal fixation of fractures, and arthroplasties, while spine operations constituted 34%. This variation in operative procedure in the two group makes comparison of effectiveness of prophylactic antibiotic invalid.

#### Deep infection rate and age group ( Table III )

Eighty per cent of the patients were between the ages of 20 years to 80 years. Between the ages of 20 to 40 years, the infection rate was 1.92%. Between 40 to 60 years, it was 3.47% and between 60 to 80 years, it was 9%. This shows a progressively increasing infection rate with age, with a marked increase after the age of 60 years. There were 46 patients between the ages of 80 to 100 years and there was no infection in this group. Below the age of 20 years, there were 100 patients with a deep infection rate of three per cent. Statistical comparison between these group is again difficult because of the small number of patients in some groups.

**Table III**  
Age and infection rate

Age (years)	No. of patients	Deep infections	Percentage
Below 20	100	3	3
20-40	313	6	1.92
40-60	144	5	3.47
60-80	100	9	9
80-100	46	0	0

#### Discussion

Infection following an orthopaedic procedure where an implant is used (internal fixation/joint replacement) remains one of the most dreaded complications which can lead to severe morbidity and even mortality. Musculoskeletal sepsis results in an unhappy patient, guilty surgeon and high cost to the hospital. Since the time of Lister and the use of carbolic spray, great strides have been made in the reduction of the incidence of post operative infection over the years. Reduction in the incidence of infection starts with surveillance and is a collective effort on the part of the surgeon, all staff involved in patient care and the hospital administration. Several factors affect the infection rate including wound contamination, skin preparation, length of pre-operative hospital stay, duration of surgery, air handling, drainage of wounds, age of patient and skill and technique of the surgeon<sup>1</sup>. Our overall infection rate in the year 1991 was 6.83%, with a deep infection rate of 3.27%. This figure of 3.27% is higher than the internationally accepted rate of 2% or less. An infection rate of more than 2% should be a cause for concern and investigation.

This 3.27% deep infection rate may be an underestimate of the true figure because of the fact that this is a retrospective study where inadequate documentation is often a problem. The average infection rate for operations involving the bone is 4.2% and is of concern because it is infections that involve the bone that is a major problem. Infection rates for individual surgical procedures in this study are not of much significance because the numbers

involved are simply too small to be of statistical significance.

The higher infection rate involving senior surgeons (consultants) is consistent with the fact that they perform more difficult and lengthier surgery. The absence of any deep infection among cases done by medical officers possibly reflects the fact that they performed simpler and uncomplicated procedures.

Higher infection rates in older patients as found in this study is well known. However a 9% infection rate between the ages of 60 to 80 years is very high. This is again probably due to the small number of cases in this group (100 cases).

No valid conclusion can be drawn regarding the use of prophylactic antibiotics, because of the wide variety of procedure in which it was used. However it has

been well established that prophylactic antibiotics reduced the infection rate especially when used in cases operated on in conventional operation theatres such as ours.

In conclusion, our study shows that our deep infection rate is higher than most published figures and we feel that there is a cause for concern and investigation and a need for on-going surveillance, data collection and a concerted effort by all concerned to attain a reduction in overall infection rates at least to an internationally accepted figure of less than 2%.

### Acknowledgement

The authors wish to thank Ms. Sharmini Devi for typing the manuscript and Ms. Lim Saw Kim for helping with data entering and help with the computer.

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