Incidence of Early Post Operative Infection after Primary Total Knee Arthroplasty at an East African Centre

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Abstract

Introduction: Surgical site infections (SSI) may occur after orthopedic surgery and are associated with increased costs, more surgical procedures and death. Various techniques have been developed to reduce this risk. Operation theatres in Africa are not as sophisticated as those in the west and one may expect higher rates of infection after primary Total Knee Replacement Arthroplasties (TKRA). We conducted a study to determine the incidence and risk factors for the development of post operative SSI after primary TKRA at a hospital in Africa over a fourteen year period. **Methodology**: A retrospective cohort study was conducted of all TKRA patients. The incidence of infection was determined for the first thirty days after surgery. The study was approved by the institution ethics committee. **Results**: The incidence of early postoperative SSI was 6.49%. We did not identify any risk factors for the development of SSI. **Conclusion**: There may be an increased risk of early SSI after primary TKRA in our region. Larger studies are needed to identify the modifiable risks factors.

Keywords: Total Knee Replacement Arthroplasty, Infection, East Africa

Ann Afr Surg. 2015; 12(2): 70-2.

Introduction

Surgical site infections (SSI) are an expected consequence of surgery and this risk is increased in the presence of implants. Patients who develop SSIs are at a higher risk for increased medical care costs, more surgical procedures and death (1,2). To mitigate this risk, surgeons have employed various techniques including careful patient selection, aseptic techniques and use of prophylactic antibiotics. These measures have reduced the risk of post operative SSIs in primary TKRA to between 0.4% and 2% (2-5). Many guidelines from various protocols advocate for the initiation of prophylactic antibiotics within one hour of the incision and continued up to 24 hours after the end of the operation(6-8). In Africa few centers have temperature control, laminar flow or the use of space suits and this may lead one to believe that the risk of post operative SSIs would be higher. There is also a paucity of data on the outcome of arthroplasty patients in the region. We therefore conducted a study to determine the incidence of post operative SSI after primary TKRA at a high volume hospital in East Africa and to determine if this was at variance with incidence rates reported in literature. We also sought to determine any risk factors that may be associated with an increased risk of the development of SSI in our setting.

Methods

This was a retrospective cohort study of all primary total knee arthroplasties at our hospital's orthopedic unit from 1998 to 2011. Our hospital is a mission hospital serving patients from all over the country with a few patients coming from neighboring South Sudan, Tanzania and Uganda. We collected data on demographics, presence of infection and outcomes after the infection from the patient charts. We also collected data on possible risk factors for infection including common medical co morbidities, body weight and duration of surgery. Patients were routinely seen at two weeks, six weeks, six months postoperatively and annually after that. Standard aseptic techniques were used in all patients including cleaning the surgical site with iodine and alcohol, double gloving, water proof draping, and frequent change of gloves by the surgical team. Movement in and out of the operating

room was kept to a minimum as was the number of members of the operating team. Our facility does not have laminar flow and space suits are not used . All patients undergoing a total knee arthroplasty had an intravenous antibiotic given within 60 minutes of surgical incision and the surgeries were conducted by several surgeons of varying experience. The midline approach with medial para-patella arthrotomy was utilized in all cases. Patients were deemed to have early infection if any of the following were noted in the first thirty days post operatively during the routine follow up at the outpatient clinic; any wound discharge after the fifth post operative day, purulent wound discharge at any time or a sinus at the operation site. Wound swabs for culture and sensitivity were not performed routinely. We excluded any patients who did not have follow up data for the first 30 days. The study was approved by the institution ethics committee which determined that written consent was not required being a retrospective study and waived the need for written consent. Data was collected using a questionnaire designed for the study and analyzed using SPSS ver17.0 (IBM corp. New York, USA). The incidence of infection was calculated as the number of patients who suffered an infection in the first 30 days after surgery divided by all the patients who underwent the procedure and followed up for at least 30 days. The Fischer's exact test was used to determine statistical significance of the incidence of infection and the various risk factors.

Results

There were 231 primary total knee arthroplasties in the fourteen year period (Table 1). The male to female ratio was 1:3 and the mean age was 67.3 years (SD 8.3). The most common indication for surgery was osteoarthrosis (95.7%). All the implants used were cemented using cement impregnated with an antibiotic (2g gentamycin in every 40g of cement). The two most common implants used were Depuy (78.8%) and Zimmer (5.2%).

The median duration of follow up was 16.1 months (IQR 3.5,43.5) with a range from 0.2-149.3 months. There were 15 cases of infection in the first thirty days post operatively giving an incidence of 6.49% (Table 1). There were nine patients with superficial infection that was managed on oral antibiotics. These cases resolved without need for further treatment. Six patients had deep infection and underwent implant removal and fusion. This was followed by a course of intravenous and oral antibiotics. Table 2 shows the risk factors identified and their relative risks of infection.

Table 1: TKRA done and infections seen over the fourteen years

Year	Number Done	Infection
1998	1	0
1999	14	0
2000	19	0
2001	21	0
2002	39	1
2003	65	3
2004	64	1
2005	109	1
2006	60	2
2007	70	2
2008	42	0
2009	44	1
2010	59	2
2011	57	2

Table 2: Risk factors for infection

Risk Factor	Number (% of all patients)	Infection (%)	P value
Hypertension	104 (45)	10 (9.6)	0.081
Diabetes	35 (15.2)	1 (2.9)	0.298
Weight>80kgs	74 (39.1)	6 (8.1)	0.593
Duration of Surgery >90min	129 (68.9)	7 (5.4)	0.943

Discussion

The incidence of infection in our study was 6.49% which is high. Most centers around the world report rates less than 2% (2-5,9). Our centre has previously reported results in hip arthroplasty that are comparable to those in western literature performed by the same surgeons (10). TKRA has been shown to have a higher incidence of infection when compared to hip arthroplasty (11). It has also been shown that centers in the developing world may have higher rates of infection after TKRA (12). Further studies are need to discern the modifiable risk factors associated with this.

Though the incidence rates of infection in patients with hypertension and a body weight above 80 kilograms were higher than other patents, this difference did not reach statistical significance. Literature has identified several risk factors including increased BMI and diabetes (9). Patients with these co-morbidities should be counseled appropriately. Future studies should interrogate this area more thoroughly.

The patients who had deep infection underwent knee fusion. In many centers they would have benefitted

from revision knee arthroplasties (13). At the time of this study, the implants for revision surgery were not easily available and the costs were beyond the reach of many of our patients. Though the expertise and implants are now available, the costs of revision arthroplasty is still high. Knee fusion results in a much poorer quality of life for the patient further signifying the impact of infection in our patients.

Limitations

This study though having a relatively large number of patients for our region, it is limited because of its retrospective nature and in not including routine microbiological studies for patients with clinical suspicion of infection.

Conclusion

There may be an increased risk of infection after primary TKRA in East Africa. Larger and better conducted studies are needed to determine any modifiable risk factors associated with this risk. The availability of revision knee implants may make the outlook of patients who suffer infection less grim. Surgeons working in this region need to be more stringent in infection control measures when conducting TKRA and to anticipate a possible increased risk in obese and hypertensive patients.

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