

Bilateral total knee arthroplasties: A retrospective study comparing simultaneous and unilateral knee replacements

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Abstract

Aims:

Numerous papers document the advantages of a simultaneous operation, namely a single anaesthetic and reduced overall hospital stay. These benefits have to be viewed with the risks associated with a longer anaesthetic, pain control and rate of post-operative complications.

In this preliminary study a comparison was made between simultaneous bilateral versus unilateral arthroplasties performed by the same orthopaedic team over three years.

Settings and Design:

Data was collected retrospectively of patients who underwent simultaneous bilateral knee arthroplasties and those who underwent unilateral arthroplasties between 1999 and 2002 by the same orthopaedic team. Length of hospital stay, days to ambulate, blood loss, analgesia and complication rate were compared for both groups.

Results:

There were no statistically significant differences in blood requirements, time to ambulate, analgesia requirements, hospital stay or complication rates.

Conclusions:

The results indicate that with appropriate patient selection, individuals who present with bilateral symptomatic knees can be operated under a single operative bilateral procedure without increased risk of complications and leading to an overall reduction in hospital stay.

INTRODUCTION

Surgical treatment of symptomatic bilateral knee arthritis has led to much debate amongst orthopaedic surgeons and the literature appears to be split for

(^{1,2,3,4,5,6,7,8,9,10,11,12,13,14,15,16,17,18,19,20,21}) or against (^{22,23,24,25,26}).

The advantages of a simultaneous bilateral knee arthroplasty include a single anaesthetic, reduced hospital stay and cost effectiveness. These are counterbalanced by a perceived greater risk due to a longer anaesthetic, pain relief, blood requirements, and thrombus or fat emboli.

In this retrospective study, two similar groups of patients

were compared according to the result obtained after undergoing a unilateral or bilateral knee arthroplasty by the same orthopaedic firm. Length of hospital stay, blood requirements, and change in haemoglobin values, analgesia requirements and complications were recorded and compared.

SUBJECTS AND METHODS

Data was collected from patients that underwent from 1999-2002 underwent unilateral or bilateral total knee replacements by the same orthopaedic team at St Luke's General Hospital in Malta. Of these 20 underwent bilateral total knee arthroplasties whilst 21 underwent unilateral

procedures.

Patients underwent a routine pre-operative medical assessment and where warranted were assessed by a physician and anaesthetist and counselled as to the risks involved. In this study there was no upper age limit for a unilateral or bilateral procedure. The oldest patient in the unilateral group was 78 years and in the bilateral group 83 years.

Regional (spinal) anaesthesia was used in 7 of the bilateral group and 13 of the unilateral group, while general anaesthesia was used in the remainder. Tourniquet was used in both groups and a single preoperative dose of cefuroxime 1.5gram given intravenously, followed by 2 further doses of 0.75 grams 8 hours and 16 hours post operatively. A standard medial parapatellar approach was employed. Excision of osteophytes and balancing of soft tissues and adequate realignment to correct any angular deformities were performed. Similar design posterior cruciate-sparing TKR prosthesis was utilised for both groups and cemented using third generation techniques. Two suction drains were inserted in each knee. Skin closure was followed by sterile dressing and compression bandaging around the knee.

Both groups of patients were treated according to a similar post operative protocol of compression stockings and low dose unfractionated heparin. Physiotherapy included static quadriceps exercises on day 1 and assisted knee flexion. Suction drains were removed on day 2 post op.

From the data collected in the medical files, hospital stay, blood usage, perioperative haemoglobin values, time to ambulate, complications and analgesia were monitored.

RESULTS

The following is a table showing patient demographics:

Figure 1

Table 1: Distribution of groups

Parameters	Unilateral group (n=21)	Bilateral group (n=20)
Years (mean)	72.2(SD 5.7)	72.0(SD 4.3)
Range of years	62-79	66-83
Females (%)	76(n=16)	85(n=17)
Males (%)	24(n=5)	15(n=3)

An unexpected finding was that when the results were grouped together, males were statistically significantly ($p<0.05$) younger 68.9 years (SD4.9) as a group when

compared to females 72.6 years (SD4.5).

LENGTH OF STAY

Target requirements prior to hospital discharge included: medical clearance, ability to walk safely and climb stairs.

The average length of stay for the unilateral group was 13.0 (SD=5.2) days and for the bilateral group 14.7(SD=3.3) days. There was no statistical significant difference ($p=0.21$) between the groups. Of note 2 patients in the unilateral group had a prolonged hospital stay of 33 days each due to social reasons.

BLOOD USAGE

Blood transfusions were required in 29% (n=6) of the unilateral group and 50%(n=10) of the bilateral group. However this was not statistically significant ($p=0.16$).Neither was there any statistically difference between the pre- and post-op haemoglobin values between the groups ($p=0.35$).

Figure 2

Table 2: Variation in pre- and post-op haemoglobin values

Parameters	Unilateral TKR	Bilateral TKR
Average haemoglobin difference (g/dl)	2.91	3.23
Range	1.6-5.3	1.3-6
SD	0.89	1.26

DAYS TO AMBULATE

Ambulation was considered as the patient walking with the aid of a therapist. There were no statistical differences between the groups ($p=0.46$).

Figure 3

Table 3: Days to ambulate

Parameters	Unilateral TKR	Bilateral TKR
Average no. of days to ambulate	2.1	2.2
Range	1-3	1-3
SD	0.5	0.4

ANALGESIC REQUIREMENTS

Various analgesic preparations were utilised post-op including opioids (pethidine), NSAIDS, paracetamol and co-proxamol. Typical post-op analgesia regime included patient controlled analgesia with intra-venous opioids for the 1st one to two days post op, followed by oral analgesics with intramuscular opioids used only for break-through pain. However requirements were tailored according to patient

demand. Regarding length of analgesic use post-op there were no statistical significant variations between the groups ($p=0.78$)

Figure 4

Table 4: Length of analgesia use

Parameters	Unilateral TKR	Bilateral TKR
Average no. of days of analgesia use	11.1	11.5
Range	6-22	4-21
SD	4.3	5.7

COMPLICATIONS

Excluding blood transfusion, a number of post-op complications occurred in the unilateral ($n=5$) and bilateral ($n=5$) groups. These ranged from DVT to an episode of TIA.

Figure 5

Table 5: Post-op complications

Complication	Unilateral TKR	Bilateral TKR
Wound infection	1	0
Bronchopneumonia	2	1
Post-op confusion	1	1
Chest pain/ ? Pulmonary embolus	0	1
Allergy to wound dressing	0	1
TIA	0	1
DVT	1	0

DISCUSSION

From this study simultaneous bilateral knee arthroplasty appeared to be safe and the alleged risks involved were more than acceptable. This finding compares well with a number of other studies [1,2,3,4,5,6,7,10,11,12,13,14,15,16,17,18,19,20,21].

The average length of stay for the bilateral procedure patients was 1.7 days longer. These indicate an important reduction in bed occupancy and therefore accompanying costs and these results are seen in other studies [1,2,4,8,9,11,12,15,21].

Blood usage and peri-operative change in haemoglobin indices indicate a trend for increased blood loss in the bilateral procedure. This would reflect the findings in various studies some of which even obtained statistically significant results [1,12,15,22] whilst others showed no differences between the groups [2,3,4,5,6,7,11,13,14,15,16,17,18,19,20,21].

It therefore appears that patients for total knee arthroplasties,

especially if bilateral, are ideal candidates for autologous blood autotransfusion use during the operation and for autologous pre-donated blood.

Days to ambulate were practically identical in both groups. This finding was documented in other studies [1,2,4,6,7]. This is an important finding as early mobilisation of the patient is fundamental in the rehabilitative process and to minimise further the risk of thrombo-embolic complications.

As in other studies [1,6,12,17,18] length of analgesic use was practical the same between the two groups. A recent study has advocated the use of an epidural in the bilateral group [1] but this was not supported by other literature.

Complication rates were comparable between the groups and this is supported by a large number of studies [1,2,3,4,5,6,7,10,11,12,13,14,17,18,19,20,21]. However, other studies have indicated an increase in postoperative complication in the bilateral group, especially cardiopulmonary and post-operative confusion [15,19,22,23,24,25,26].

In conclusion, the decision to perform a bilateral versus unilateral knee arthroplasties must take into account three factors: the patient's desires; the medical condition of the patient when one considers the longer anaesthetic and twice the physical trauma; and lastly in this modern day the availability of beds and the cost saving advantages of a bilateral procedure [4,8,9,14,15,20,23].

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