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## Single stage bilateral total hip replacement: Is it an option or a risk?

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### Abstract

**Objective:** To evaluate safety and feasibility of two-stage total hip arthroplasty and to compare it with single-stage procedure.

**Methods:** The retrospective study was conducted at The Aga Khan University Hospital and comprised all cases of total hip replacements between January 2001 and December 2014 that were retrieved from the database using International Classification of Diseases (9th Revision) coding. A standardised questionnaire was completed, including patient demographics, primary diagnosis, peri and postoperative morbidity and mortality. Differences among patients' data were analysed using chi square test for dichotomous variables and student t-test for continuous variables.

**Results:** Of the 48 cases, 34(71%) had single-stage bilateral total hip replacement and 14(29%) had two-stage procedure. The mean hospital stay in the single-stage group was  $8.1 \pm 3.2$  days compared to  $19.6 \pm 5$  days in the other group. The two-stage group required a significantly greater need for transfusion compared to the single-stage group ( $P < 0.05$ ). There was no statistically significant increase in peri or postoperative complication ( $p > 0.05$ ).

**Conclusion:** Simultaneous bilateral total hip arthroplasty was found to be a safe and viable option with a decreased transfusion requirement and shorter hospital stay along with no significant increase in morbidity or mortality.

**Keywords:** Total hip arthroplasty, Aga Khan University Hospital, International Classification of Diseases. (JPMA 65: S-91 (Suppl. 3); 2015)

### Introduction

Since the advent of total hip arthroplasties (THAs) in the 1960s, this procedure has become very commonly adopted for the management of arthritis. More commonly, arthritis tends to involve some joints more than the others and total hip arthroplasties are most commonly performed unilaterally. It is not uncommon to have patients who require bilateral total hip replacement which is required in approximately 15% to 25% patients,<sup>1</sup> which gives rise to the question, is bilateral hip arthroplasty a safe and viable option. Several studies have been done to compare outcomes of single-stage (SS) bilateral THA versus two-stage (TS) THA in attempt to delineate the better therapeutic option. Initial studies reported an increased risk of complications, especially pulmonary<sup>2-4</sup> though recent studies show fewer complications,<sup>5-11</sup> including a comparable risk of 90-day mortality.<sup>12</sup>

SS bilateral THA offers the benefit of single anaesthesia, shorter hospital stay, and cost-effectiveness in addition the potential benefit of early rehabilitation and better hip function.

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### Materials and Methods

The retrospective study was conducted at The Aga Khan University Hospital and comprised all cases of total hip replacements (THR) between January 2001 and December 2014 that were retrieved from the database using International Classification of Diseases-(9th Revision (ICD-9)) coding. SS and TS patients were sorted out and a standardised questionnaire was completed, including patient demographics, primary diagnosis, perioperative complications on the basis of inpatient and outpatient visits.

Patients lost to follow-up, incomplete records or those who underwent any additional studies in the same visit were excluded.

Age and gender distribution was recorded and compared between the groups. The fitness of the patient was recorded in terms of American Society of Anaesthesiologists (ASA). The diagnosis of patients was also recorded. The procedure had been carried out by two primary surgeons in laminar air flow system under general anaesthesia (GA).

The time of surgery, estimated blood loss, and transfusion requirement were recorded. In the TS group, surgery time was recorded from the time of incision to dressing time, and in the SS group it was from the time of incision to dressing time of second hip minus the change of position time when the posterior approach was used. The

estimated blood loss was calculated by the anaesthetist using the swab count, amount in suction drain minus the irrigation used. And the transfusion requirement was decided on the basis of either patient symptoms (tachycardia etc.) or haemoglobin (Hb<7).

Each patient had preoperatively received 2g cefazolin which was continued till 3 post-operative doses. Subcutaneous enoxaparin 40qd was given to each patient and early mobilisation was encouraged by trained physiotherapists. Patients were mobilised from bed to chair on 1st postoperative day (POD) and ambulated on 3rd POD, if tolerated by the patient.

Data analysis was done on SPSS 19 and data was expressed as means  $\pm$  standard deviation. Differences among patients' data were analysed using chi square test for dichotomous variables and student t-test for continuous variables. The confidence interval (CI) was set at 95% and  $p < 0.05$  was considered significant.

## Results

Of the 48 cases, 34(71%) had SS bilateral THR and 14(29%) had two-stage procedure. There were no significant differences observed in terms of age, gender, BMI, preop Hband ASA status between the groups (Tables-1 and 2). The most common reason for the procedure in the SS group was Avascular necrosis (AVN) in 22(65%), whereas in the TS group it was osteoarthritis in 8(57%) (Table-3).

The mean length of surgery showed no significant

**Table-1:** Patient Characteristics.

	TS (n=14)	SS (n=34)	P value
Age	42 $\pm$ 14.2	39 $\pm$ 15.0	0.836
BMI	27 $\pm$ 6.5	25 $\pm$ 4.8	0.362
Gender (M:F)	3:4	15:2	
Hb ( pre-operative)	11.9 $\pm$ 1.7	12.9 $\pm$ 1.8	0.66

TS: Two-stage

SS: Single-stage

BMI: Body mass index

Hb: Haemoglobin

**Table-2:** ASA status.

ASA	TS (n=14)	SS (n=34)
1	2	10
2	8	20
3	4	2
4	0	2

TS: Two-stage

SS: Single-stage

ASA; American Society of Anesthesiologists.

**Table-3:** Reasons for the procedure.

Diagnosis	TS (n=14)	SS (n=34)
OA	8	4
AVN	0	22
AS	4	4
RA	2	0
JRA	0	2
DDH	0	2

TS: Two-stage

SS: Single-stage

\*OA, Osteoarthritis; AVN, Avascular necrosis; AS, Ankylosing Spondylitis; RA, Rheumatoid Arthritis; JRA, Juvenile rheumatoid Arthritis; DDH, Developmental dysplasia of Hip.

**Table-4:** Outcome

	Stage	Mean	Standard Deviation	P value
Hospital Stay (days)	TS	19.6	$\pm$ 5	0.026
	SS	8.1	$\pm$ 3.2	
Length of surgery (mins)	TS	358	$\pm$ 72.6	0.515
	SS	273	$\pm$ 58.2	
Anaesthesia time	TS	366	$\pm$ 59.7	0.015
	SS	461	$\pm$ 101.2	
Transfusion	TS	2.3	$\pm$ 2.6	0.01
	SS	1.2	$\pm$ 1.3	
Complications	TS	0.07	0.267	0.707
	SS	0.09	0.288	

TS: Two-stage

SS: Single-stage.

difference between the groups (358 $\pm$ 72.6min in TSvs 273 $\pm$ 58.2min in SS), but the mean anaesthesia time was significantly increased in the TS group (461 $\pm$ 101.2min in SSvs 366 $\pm$ 59.7min in TS) (Table-4).

Patients in either group had no intra-operative complications. One (7%) patient in the TS group had left hip dislocation, requiring revision of acetabular component postoperatively. Three (9%) patients in the SS group had post-operative complications, including acute kidney injury (AKI), urinary retention and left hip dislocation (traumatic), and were managed conservatively.

## Discussion

THR remains an everyday procedure in orthopaedic surgery with rising demand.<sup>13</sup> A study<sup>1</sup> in 1967 estimated that 15-25% patients required bilateral hip replacement, and another study<sup>14</sup> estimated that a third of all patients with primary osteoarthritis required bilateral hip surgery.

Although earlier studies had shown increased risk of medical co-morbidities or a sub-optimal gain in activities of daily living (ADL) associated with single-stage

procedure,<sup>2,15,16</sup> but our study showed no such increase in complications compared to the two-stage procedure. However, the small study sample needs to be kept in mind while drawing any inferences. A lone study<sup>9</sup> found no significant increase in such complications and stated it as a safe and appropriate procedure in the Asian population. According to one study,<sup>10</sup> in patients who have no contraindications related to an unacceptably high surgical risk, single-stage bilateral THA deserves consideration in two situations; incapacitating bilateral hip disease with normal hip position, and hip disease with bilateral abnormalities in hip position

Theoretical advantages such as an overall shorter hospital stay, single rehabilitation programme and improved rehabilitation due to complete clearance of disease and, hence, better functional outcome have been postulated and shown in various publications.<sup>10,17</sup> In our study, the length of stay was significantly lower in the SS group compared to the TS group, as established in previous studies.<sup>7</sup> The decreased need for transfusion requirement in the SS procedure, described earlier,<sup>5</sup> was also shown in our results to be statistically significant.

In 2004, the density of orthopaedic surgeons in the United States was 6.2 per 100,000 population.<sup>[18]</sup> Since no data for Pakistan is available, it is, therefore, assumed that we have no greater density. Second to health, time seems to be one of the most precious commodities. Considering the literature and results from our study, it is safe to state there is no statistical difference in the incidence of intra or post-operative complication if proper pre-operative evaluation of patients, planning and optimisation is done. Importantly, the length of hospital stay in SS surgery seems to be invariably decreased in literature and in our study, which may contribute to an increased cost and mental stress associated with a TS procedure.

A study based on data derived from a Swedish registry reported a 20% decrease in hospital costs and 30% reduction in sick leaves.<sup>19</sup> To draw any conclusions in our setting, however, a randomised, prospective study covering all aspects is needed.

## Conclusion

A decrease in anaesthesia time, transfusion requirement, and hospital stay associated with SS bilateral hip replacement was noted. However, the retrospective nature and small sample size did not allow us to detect any significant difference in complications

between the two groups.

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