ONE-STAGE BILATERAL TOTAL HIP REPLACEMENT : A RETROSPECTIVE STUDY OF 70 PATIENTS

H. WELTERS, I. JANSEN, J. P. SIMON, J. DEVOS

In this study, we retrospectively reviewed 70 patients who had a one-stage bilateral total hip replacement in our institution, between 1992 and 1998. Different variables were considered such as gender, age, length of hospital stay, pre-operative diagnosis, duration of the operation and anesthesia, type of prosthesis, complications and amount of blood loss, pre-and postoperative range of motion, incidence of periarticular heterotopic ossifications and postoperative pain and walking distance.

In our group of patients one-stage bilateral total hip replacement was found to have resulted in good objective results. Patients with a rheumatoid condition had the highest gain in postoperative hip mobility. In comparison with existing literature there were no more intra- or postoperative complications, making one-stage bilateral total hip replacement a safe procedure in well-selected cases.

Keywords : total hip replacement ; bilateral.
Mots-clés : prothèse totale de hanche ; bilatérale.

INTRODUCTION

The first cases of one-stage bilateral total hip replacement (THR) were done at the end of the 1960s. In the beginning, the practitioners anticipated fewer complications with this procedure and quicker rehabilitation compared with a two- stage bilateral THR (7, 8). However, in their 1976 report Ritter and Randolph described a higher incidence of periarticular heterotopic ossifications (PHO) (8% of all hips) and deep venous thrombosis (DVT) (12% of all hips) using this procedure (11). In another report, the same authors confirmed the higher risk of PHO, particularly in male patients suffering from primary coxarthrosis with massive osteophytosis (13). In these studies, a comparison was made with a control group in which only one THR was done. Attention was focused on the fact that a one-stage bilateral THR is not without risk and that a thorough screening and evaluation for the selection of patients is necessary before the operation is done.

The purpose of this study was to evaluate the short-term results in 70 patients who underwent the operation in our institution, paying special attention to postoperative complications and functional recovery of both hips (mobility, pain and walking distance).

MATERIAL AND METHODS

1. Description of the operation

All procedures were done under general anesthesia. Each patient received antibiotic prophylaxis (Na-cephazoline, 3 × 2 g. IV). As a thromboprophylactic agent, 20 mg. of SC. Enoxaparine was given the day before the operation and a further daily dose of 40 mg. SC. was administered up to 6 weeks postoperatively. To prevent PHO, 38 patients were given indomethacine starting the night before the operation, continuing for 10 days postoperatively (first 3 days 100 mg/day suppositories, the

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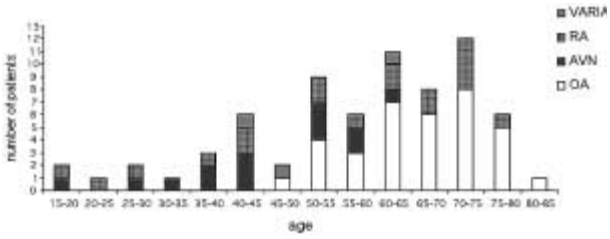

Fig. 1. — Age at bilateral THR

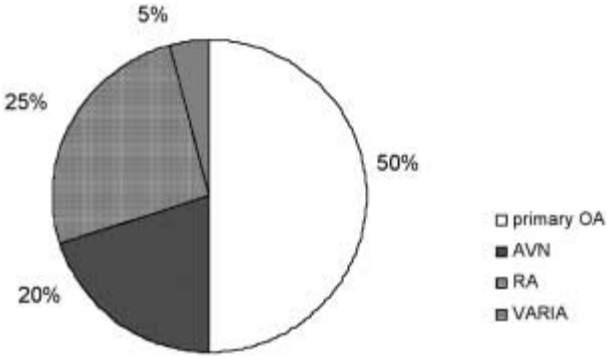

Fig. 2. — Pre-operative diagnosis

next 7 days 75 mg./day oral). Thirty-two patients received piroxicam 20 mg daily, also starting the night before the operation until the tenth day after the procedure.

All patients in this study were operated in lateral decubitus with a thoracic pillow to protect the brachial plexus and the radial nerve. We made sure that after draping the patient, the upper leg could be moved freely. A posterolateral approach according to Kocher was used (13). The sciatic nerve was exposed in all cases over 6 cm. Marking points were made on the ischial tubercle and greater trochanter using methylene-blue, to maintain or adjust the leg length.

A T-shaped incision was made in the capsule and the femoral head was dislocated posteriorly and removed with a saw. Using a special pair of scissors, a ventral capsulotomy was done to improve the visibility of the acetabulum and to improve postoperative mobility. In addition 19 psoas releases, 30 adductor releases and 3 fascia lata releases were done in this group.

The fact that a bilateral THR was done in one stage did not automatically result in a longer immobilization of the patient. If in good general condition the patients were mobilized from day 2 to 4 postoperatively. They were encouraged to use 2 crutches for 6 weeks. Full weight bearing was allowed immediately.

2. Patients : the whole group

Seventy patients were included in this study. The follow-up time ranged from 3 months to 4 years. All patients underwent one-stage bilateral THR between 1992 and 1998. The study consisted of 33 men and 37 women with a mean age of 57.6 years (ranging from 17 to 80 years) (fig. 1).

The following variables were considered :

1) Gender,
2) Age,
3) Total and postoperative hospital stay,
4) Pre-operative diagnosis,
5) Duration of the operation and anesthesia,
6) Type of prosthesis,
7) Complications and amount of blood loss,
8) Total range of motion (TROM), pre-and postoperative.
9) Periarticular heterotopic ossification (PHO)
10) Postoperative pain and walking distance.

To evaluate the extent of PHO in each patient, we used the classification according to Brooker *et al*. (3). We also considered the degree of pain experienced, walking distance and postoperative hip mobility and applied the numerical classification system according to Merle-d'Aubigné-Postel (Charnley modification) (table I) in each case. In 35 patients the pre-operative diagnosis was primary coxarthrosis, 18 patients presented with a rheumatoid condition (14 with rheumatoid arthritis, 3 with Bechterew's disease and 1 with psoriatic arthropathy), 14 with avascular necrosis (AVN), 1 with a fracture and 2 with hip dysplasia (fig. 2).

RESULTS

The mean hospital stay was 17.5 days, ranging from 8 to 30 days. The majority of patients stayed between 12 and 23 days (fig. 3). The longest stay (30 days) was noted in an extremely obese female patient. Due to her obesity and bilateral serious hip condition she was almost bedridden when admitted for surgery. Following the bilateral one-stage THR, rehabilitation was slow and she developed a sacral decubitus wound. She was transferred to a rehabilitation center where she remained for another 18 days. One patient was not included in calculating the mean hospital stay because of his unusual medical status. He was a young male patient

Table I. — The numerical grading of hips (Merle-d'Aubigné - Postel)
Hip Scoring System

	Pain	Walk	Total Motion
I	Severe, Spontaneous	Bedridden or a few yards two sticks or crutches	0°-30°
II	Severe on attempting to walk. Prevents all activity	Time and distance very limited with or without sticks	30°-60°
III	Pain tolerable permitting limited activity	Limited with one stick. Difficult without stick. Able to stand long periods	60°-100°
IV	Pain only after some activity, disappears with rest	Long distances with one stick ; limited without a stick	100°-160°
V	Slight or intermittent pain on starting to walk but becoming less with normal activity	No stick but a limp	160°-210°
VI	No pain	Normal	210°-260°

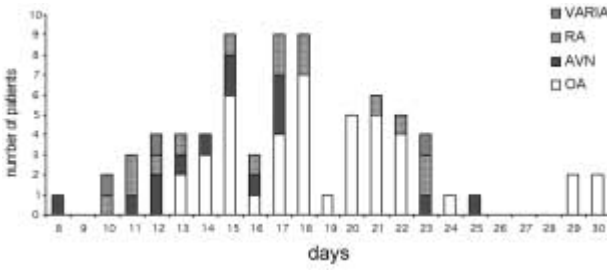

Fig. 3. — Duration of hospital stay

Table II. — Hospital stay for one-stage bilateral THR
according to various authors

Author	Number of days in hospital
Frederick (10)	9.7
Eggli (9)	14.0
Ritter(16)	16.4
Shih(7)	17.9
Ritter (15)	21.0
Hughes (13)	26.8
Bracey (2)	27.6
Mean	19.06

affected by juvenile rheumatoid arthritis since the age of four. At the age of 15, 4 weeks following his one-stage bilateral THR, he had a one-stage bilateral total knee replacement during the same hospital stay, which led to a much longer in-hospital time than for the one-stage bilateral THR on its own.

The hospital stay of our patients was not any longer when compared with the patients of other authors (table II). The mean total operating time was 228 minutes (ranging from 160 to 335 minutes). The mean total time of anesthesia was 423 minutes (ranging from 310 to 580 minutes). The mean per-operative blood loss was 1341 ml. In the whole group, 30 patients underwent an adductor release, 19 a psoas release and 3 a release of the fascia lata. We used a cemented stem in all cases : in 52 hips an MS-30 ® stem (Sulzer®) and in 88 hips an Exeter® stem (Howmedica®). We implanted a cemented cup in 45 hips : 27 Exeter® cups (Howmedica®), 17 Müller cups (Sulzer®) and 1 Charnley cup (Dicas®). In the other 95 hips, an uncemented Morscher cup (Sulzer®) was implanted. The postoperative complications are shown in table III. In the whole group, the mean pre-operative TROM was 112° and the mean postoperative TROM was 175°. There was no significant difference between the left and right side. The mean TROM-values (pre-op. and postop.) for different conditions are shown in figs. 4a and b. The results of the pre-and postoperative pain and walking distance are shown in figs. 4c,d,e and f. The majority of hips (117) showed no signs of PHO (grade 0) on xrays. Thirteen patients had PHO grade 1, 9 patients had grade 2 PHO and in one patient grade 3 PHO was noted (table IV).

Table III. — Postoperative complications

Deep venous thrombosis	1
Pulmonary embolism	0
Infection : Superficial	3
Deep (MRSA),	1
Dislocation (2 revisions)	3
Sacral decubitus	1
Transient ischemic attack	1
Leg length discrepancy	1

Table IV. — Heterotopic ossification according to Brooker related to the pre-operative diagnosis

Diagnosis	OA	RA	AVN	OTHER	TOTAL
BROOKER Grade	70 hips	36 hips	28 hips	6 hips	140
0	60	31	20	0	117
1	4	5	4	0	13
2	6	0	3	0	9
3	0	0	1	0	1
4	0	0	0	0	0
					140

DISCUSSION

One-stage bilateral THR remains a controversial issue. The most important advantages mentioned in the literature are the shorter hospital stay together with lower costs (6, 15, 12) and faster rehabilitation. The most serious disadvantages are the lower profit in TROM (2) and the higher incidence of complications such as DVT, pulmonary embolism and PHO (11, 12, 13). Eggli *et al*. mentioned that the most important concern for every surgeon is fear of an increased rate in complications in such procedures. They only performed one-stage bilateral THR in 3% of a total of 4,250 patients. (6). Preoperatively, thorough medical and anesthesiological evaluation of the patient is mandatory. Obesity is considered an important contraindication. Obesity poses an increased risk for postoperative problems such as prolonged wound oozing, infection and decubitus in patients with a THR, and in our opinion even more so in a one-stage bilateral THR. Mainly patients with bilateral functionally poor hips were good candidates for a one-stage bilateral THR. The best indication for the one-stage procedure was the simultaneous occurrence of a severe flexion- and adduction contracture as frequently found in inflammatory joint diseases particularly juvenile rheumatoid arthritis and ankylosing spondylitis.

According to two studies, one-stage total hip replacement should be done under spinal aneshesia rather than under general anesthesia (1, 15). The authors mention reduced blood loss, shorter operation time, better wound healing with less systemic complications and even shorter hospital stay in patients given spinal anesthesia. Because all our patients had general anesthesia, we could not make a comparative study. All our operations were done in a laminar flow theatre at an ambient temperature between 14 and 16 degrees Celsius. Because of the lengthy operation time and low temperature environment we think in these circumstances general anesthesia is preferable for the intraoperative comfort of the patient.

In the majority of the cases described in the literature, the patients were installed in a supine position and a lateral or anterolateral approach was done. Surgeons used sandbags placed under the gluteal region or a specially developed inflatable system which was alternately inflated under the left and right gluteal region (5).

Our patients were all placed in lateral decubitus and we used the posterolateral approach. This is a fast and relatively bloodless approach in which good visibility of the joint can be achieved. Osteotomy of the greater trochanter is not necessary with this approach and as such there is no risk for nonunion and thus less risk for a postoperative limp. This leads to a faster rehabilitation (18).

The most serious disadvantages of this approach are the greater risk of sciatic nerve injury and a greater incidence of posterior dislocations (9, 18). The latter may be caused by a more difficult orientation in positioning of the cup (9) and division of the short external rotators. This may have been the cause of dislocations in three of our patients. One of those patients was treated with closed reduction, the other two had a cup revision for recurrent dislocation.

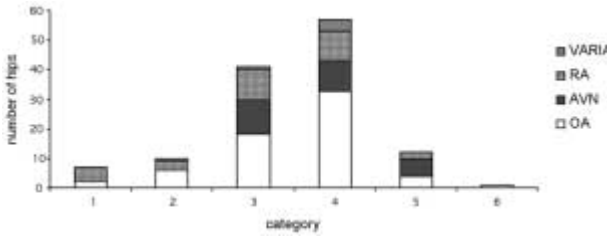

Fig. 4a. — Pre-operative TROM

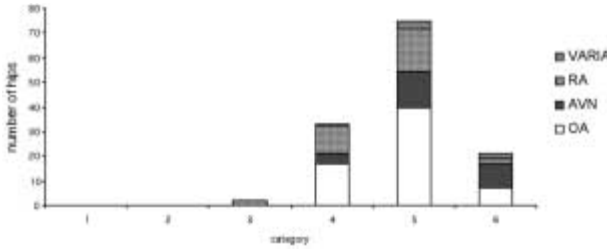

Fig. 4b. — Postoperative TROM

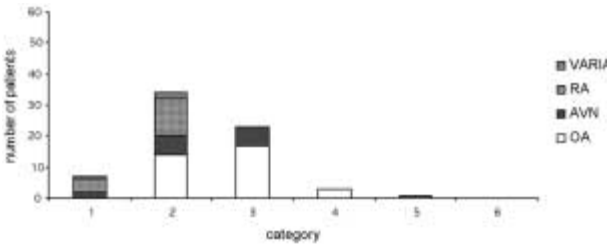

Fig. 4c. — Pre-operative pain score

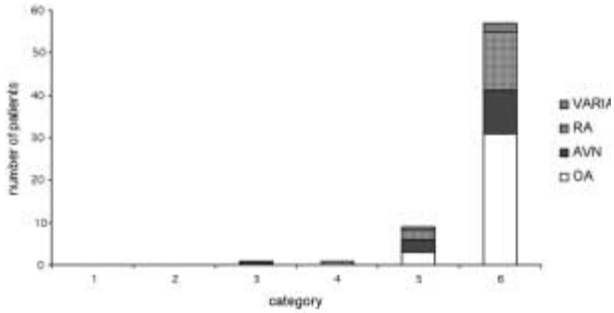

Fig. 4d. — Postoperative pain score

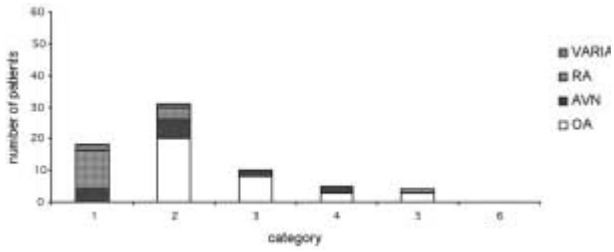

Fig. 4e. — Pre-operative walking score

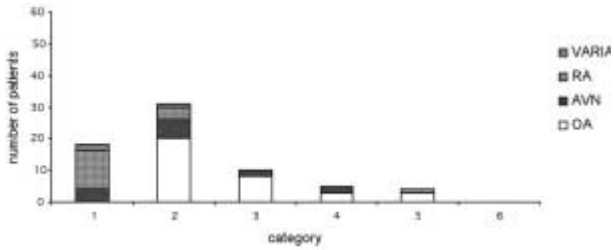

Fig. 4f. — Postoperative walking score

According to a study by Camissa *et al*. the lateral decubitus position could be an important etiological factor for complications such as pulmonary embolism, myocardial infarct and fat embolism syndrome due to hypoxemia (4). In the same study however, there was no significant difference between bilateral and unilateral procedures. Such complications did not occur in our patients.

Placing the patient in lateral decubitus position has lead to the fact that, in comparison with existing literature, the operation time and more specifically the anesthesia time was much longer in our group. This was because after the first THR, the patient had to be turned on the other side and all preparation and draping had to be redone.

Postoperative review showed that the mean gain in TROM in patients with a rheumatoid condition was higher in comparison with the global group. This supports the fact that this procedure was particularly indicated for patients with bilateral 'stiff' hips , as also described in another paper (6).

Considering the intraoperative and postoperative complications described in the literature, some authors (2, 6, 11, 13) mention that the one-stage bilateral group has a two fold increased risk for complications compared with two-stage bilateral procedures. In the more recent literature however it is agreed that there is no greater risk for complications in the one-stage THR group (6, 14). Our patients had no complications such as vascular

injuries, sciatic nerve injuries, pulmonary embolism or myocardial infarct.

Prevention of heterotopic ossification is the most effective method to obtain an excellent clinical result after arthroplasty. All patients should receive meticulous surgical technique to minimize surgical trauma to the soft tissues and to minimize contamination of the soft tissues with particulate bone debris. Beyond this there are two therapeutic limbs for prophylaxis : pharmacological and radiation therapy. All our patients received indomethacin or piroxicam for 10 days, starting the day prior to surgery. Nonsteroidal anti-inflammatory drugs act through the inhibition of the production of prostaglandin and other cellular mediators. The specific mechanism leading to inhibition of PHO is poorly understood. However studies have documented the beneficial effect of these drugs in the prevention of PHO (17). In our series of 140 hips grade 3 PHO was seen only in one hip. A disadvantage of giving NSAID's prior to the operation may be an increase in blood loss. However administering NSAID's has been a standard procedure in our hip unit both for unilateral and bilateral one-stage THR for more than 10 years and has not led to major bleeding problems so far.

CONCLUSION

One-stage bilateral THR is a safe and effective procedure which leads to good objective results. This is especially true for patients with a rheumatoid condition. These patients had the highest gain in postoperative hip mobility. Placing the patient in lateral decubitus has lead to a longer anesthesia time with this kind of procedure. In comparison with existing literature however there is no higher risk for intra- and postoperative complications. Obesity is the most important contraindication for bilateral one-stage THR.

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SAMENVATTING

H. WELTERS, I. JANSEN, J. DEVOS, J. P. SIMON. Bilaterale totale heupprothese geplaatst in één tijd. Een retrospectieve studie bij 70 patiënten.

In deze retrospectieve studie werden de resultaten bekeken bij 70 patiënten die tussen 1992 en 1998 een bilaterale totale heupprothese kregen in één tijd. Verschillende variabelen werden bekeken o.a. geslacht, leeftijd, opnameduur, preoperatieve diagnose, duur van de operatie en anesthesie, type van prothese, verwikkelingen en hoeveelheid bloedverlies, pre- en postoperatieve totale beweeglijkheid, incidentie van peri-articulaire heterotope ossificaties en postoperatieve pijn en wandelafstand.
Bij onze reeks van patiënten gaf het plaatsen van een bilaterale totale heupprothese in één tijd goede objectieve resultaten. Vooral patiënten met een rheumatoide aandoening hadden de grootste winst voor wat betreft de postoperatieve mobiliteit.
In vergelijking met de bestaande literatuur waren er niet meer per- en postoperatieve verwikkelingen. Het plaatsen van een bilaterale totale heupprothese is dus een veilige procedure in goed geselecteerde gevallen.
Obesitas is de voornaamste contra-indicatie voor het uitvoeren van een bilaterale totale heuprothese in één tijd.

RÉSUMÉ

H. WELTERS, I. JANSEN, J. DEVOS, J. P. SIMON. Prothèse totale de hanche bilatérale en un temps : étude rétrospective de 70 patients.

Les auteurs ont étudié rétrospectivement 70 patients qui avaient subi une arthroplastie totale en un temps au niveau des deux hanches entre 1992 et 1998. Ils ont étudié un certain nombre de variables comme le sexe, l'âge, la durée d'hospitalisation, le diagnostic préopératoire, la durée de l'opération et de l'anesthésie, le type de prothèse, les complications et la perte sanguine, la mobilité avant et après l'opération, l'incidence d'ossifications péri-articulaires, la douleur et le périmètre de marche.
Cette étude a montré que l'opération bilatérale en un temps avait donné de bons résultats objectifs. Le gain le plus élevé de mobilité articulaire a été observé chez les patients rhumatoïdes. Par référence aux données de la littérature, il n'y a pas eu davantage de complications per ou post-opératoires. L'arthroplastie de hanche bilatérale en un temps apparaît comme une technique recommandable dans des cas bien sélectionnés.