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BILATERAL TOTAL HIP ARTHROPLASTY: A SIMULTANEOUS PROCEDURE

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Fifty patients undergoing bilateral total hip replacement as a simultaneous procedure at the Indiana University Medical Center were compared with 50 patients undergoing unilateral total hip replacement. There was an increase in phlebitis and myositis ossificans in the patients undergoing bilateral total hip replacement and while their range of motion was less, there was no difference in mortality with one death in each group. The hospital time for patients in the bilateral group averaged 1 week longer than for those with unilateral hip replacement. The operating time and blood loss in patients of the bilateral group was approximately twice that of patients in the control group. There have been no infections as yet in the bilateral group. On the basis of these preliminary results, we can consider bilateral total hip arthroplasty feasible although it carries a slightly increased risk.

Key words: bilateral total hip arthroplasty, simultaneous; hip joint

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Although bilateral hip disease is now successfully treated by total hip replacement (Charnley 1970, Freeman 1970, Harris 1972, Jaffe & Charnley 1971, Morris & Nicholson 1970, Welch & Charnley 1970) verbal opinions differ as to whether both hips should be replaced in a single operative procedure. If a controlled study comparing patients with bilateral total hip replacements at a single operation and patients with unilateral total hip replacements were to demonstrate little or no increase in morbidity, mortality or the duration of postoperative rehabilitation with the simultaneous procedure, then that operation would seem to be a reasonable choice for patients with bilateral hip disease. This paper reports on our experience with bilateral hip replacement in one setting.

METHODS AND MATERIALS

At the Indiana University Medical Center 50 consecutive patients with bilateral total hip replacements at a single operation were compared to a control group of 50 consecutive patients with unilateral total hip replacements. Patients were matched as closely as possible with regard to age, etiology of hip disease, type of total hip prosthesis used, and length of follow-up. Since the beginning of this study, all patients for whom bilateral total hip replacement was judged the proper surgical approach underwent the bilateral procedure under one anesthetic. Individuals were not excluded from this study because of age, severe flexion con-

tracture, etiology and severity of the hip disease, or underlying medical problems. All procedures were performed or supervised by the senior author. They were compared in terms of the following: (1) length of hospitalization and operating room time, (2) type of anticoagulant used and method of administration, (3) units of blood transfusions to the patient in the operating room, in the recovery room, and on the ward, and (4) follow-up evaluations after a minimum of two years. All hip patients at the Indiana University Medical Center are coded pre- and postoperatively (in accordance with the Hospital for Special Surgery hip evaluation) as regards hip pain, walking ability, range of motion and functional capacity (Wilson et al. 1972). The senior author and head surgical nurse were scrubbed for all cases. All patients were prophylactically treated with Keflin or Cleocin for 10 hours preoperatively and 5 days postoperatively. All operations were performed under general normo-tensive anesthesia, with the patient in the supine position and a sandbag under the affected hip and in an operating room equipped with a horizontal wall-less laminar air-flow system. A straight lateral incision for removal and transposition of the greater trochanter was used in all procedures, regardless of the type of prosthesis to be used. Instruments for the total hip replacement were divided into four groups and used sequentially throughout the case. Each group of instruments was placed in a surgical basket. The entire basket was placed on the operating room table so that the surgeon could select the proper instrument at the appropriate time from the basket.

Prior to a bilateral procedure, two back tables (2′ × 4′) with draping equipment were set up and placed next to the laminar air-flow unit. One table was left covered during the first hip procedure, for later use during the opposite hip procedure. As the skin sutures were begun on the first hip, the scrub nurse and second assistant broke scrub. While the skin was being closed, this portion of the team re-scrubbed and re-gowned. As soon as the dressing was applied to the first hip, the preparation of the second hip was begun by the second assistant. The surgeon and first-assistant re-scrubbed and re-gowned. The second hip was then draped appropriately. The time from the last skin suture of the first hip to the skin incision of the second hip was approximately 20 to 30 minutes.

RESULTS

The mean age of patients undergoing bilateral total hip replacement was 63 (range 28 to 81). The 28-year-old patient had juvenile rheumatoid arthritis and the 81-year-old had bilateral osteoarthritis. The mean age of the unilateral total hip replacement patients was 65 (range 37 to 85). The 37-year-old patient had rheumatoid arthritis and the 85-year-old had osteoarthritis.

The etiology of the hip diseases is illustrated in Table 1. In the bilateral group there were 58 Charnley prostheses (29 patients), 40 Charnley-Mueller prostheses (20 patients) and two McKee-Farrar prostheses (one patient). In the group having unilateral total hip replacements, there were 28 Charnley prostheses, 17 Charnley-Mueller prostheses and five McKee-Farrar prostheses.

Table 1. Type of disease prior to surgery.

Bilateral (100 hips)		Unilateral (50 hips)	
Disease	No. of hips	Disease	No. of hips
Osteoarthritis	73	Osteoarthritis	38
Rheumatoid arthritis	8	Rheumatoid arthritis	3
Ankylosing spondylosis	4	Failed unipolar prosthesis	3
Failed cup arthroplasty	4	Avascular necrosis	2
Avascular necrosis	3	Failed cup arthroplasty	2
Gouty arthritis	2	Ankylosing spondylosis	1
Septic dislocation	2	Non-union secondary to pinned fracture	1
Failed prosthesis	2		
Failed total hip	1		
Failed osteotomy	1		

Operating-room time

The mean operating-room time (anesthetic time) for patients undergoing a bilateral total hip replacement was 3 hours and 5 minutes (range 2 hours to 4 hours and 30 minutes). This includes the 20 to 30 minute changeover time. The mean time for unilateral total hip replacements was 1 hour and 35 minutes (range 1 hour to 3 hours).

Patients with previous hip surgery (i.e. cup, prosthesis, and especially displacement osteotomy) accounted for ten of the bilateral hips and were all procedures on the longer side of the mean time, as were the six unilateral previously-operated hips. There is no question that a previously operated hip prolongs the operating time.

Type of anticoagulant and method of use

In the bilateral group, 13 patients received 5,000 units of Heparin subcutaneously the night before surgery and every 12 hours postoperatively. Eight patients received 5,000 units of Heparin 2 hours preoperatively and every 12 hours postoperatively. Twenty-eight patients were treated with Coumadin and one patient with low molecular weight Dextran. In the unilateral group, seven patients received 5,000 units of Heparin the night before surgery and every 12 hours postoperatively. Seventeen patients received 5,000 units of Heparin 2 hours preoperatively and every 12 hours postoperatively. Twenty-four patients were treated with Coumadin and one patient not anticoagulated.

Blood received

The mean amount of blood replaced in surgery for patients in the bilateral group was six units (range two to eleven units). The mean amount of blood received either in the recovery room or on the ward was one unit (range from zero to five units). Twenty-three patients in the bilateral group received no postoperative blood transfusions. In the unilateral group, the mean blood received in surgery was three units (range zero to five units). In this group of patients 35 received no postoperative blood transfusions.

Rehabilitation

All patients in both groups, regardless of the type of prosthesis, were sent to the Physical Therapy Department, 3 to 4 days postoperatively. They were begun on ambulation training beginning with tilt table activities and progressed to ambulation bearing full weight with external support. This external support (walker or crutches) was continued for 6 weeks. Use of a cane was then encouraged as long as a limp persisted.

The mean hospital stay for the patients undergoing bilateral total hip replacements was 21 days (range 10 to 42 days). The mean hospital stay for patients undergoing unilateral total hip replacement was 15 days (range 10 to 43 days).

In general, there were more complications with patients in the bilateral group than in the unilateral group (Table 2). The incidence of clinical thrombophlebitis among the bilateral patients was 12 per cent (one leg in each of six patients) or 6 per cent if related to the number of hips operated. The incidence of clinical thrombophlebitis in the control group of unilateral total hip patients was 2 per cent. In a recent article from our institution, 380 consecutive total hip replacements were evaluated as to the effect that Warfarin, low-dose Heparin or Hydrocortisone have in the prevention of clinical thromboembolic disease (Ritter et al. 1975). In 220 unilateral hips there was an average clinical thromboembolic incidence of 6 per cent (14 patients). In the 80 patients (160 hips) undergoing the simultaneous bilateral operation there was an overall clinical thromboembolic problem of 14 per cent (11 patients).

Table 2.

Postoperative complications	Unilateral	Bilateral
Phlebitis	1 patient	6 patients (one leg each)
Myositis ossificans	None	8 hips in 5 patients
Pulmonary embolus	1 patient	3 patients
Dislocation	2 patients	3 hips in 3 patients
Urinary tract infection	None	3 patients
Death	1 patient(2° to P.E.*)	1 patient(2° to P.E.*)
Sacral decubiti	None	1 patient
Non-union of greater trochanter	None	1 hip
Heel sores	None	Bilateral 3, Unilateral 0
Wound hematoma	1 patient	Bilateral 1, Unilateral 3
Femoral artery embolus	None	1 hip
Fusion	None	1 hip secondary to Myositis ossificans
Pneumonia	None	1 patient
Wound infection	None	None

* Secondary to pulmonary emboli.

The incidence of radiographically detectable myositis ossificans in the bilateral group was eight hips in five patients. There was no myositis ossificans in the unilateral group. To date there are no known infections in the bilateral patients. Therefore, an infection in a unilateral total hip replacement was not used in the control group.

Postoperative evaluation

The Hospital for Special Surgery hip evaluation form was used to determine postoperative results (Wilson et al. 1972). Of significance, is that the bilateral patients had no detectable difference in postoperative results when comparing one side with the other.

Table 3 shows that there is little difference in the years following. There was little difference in pain relief, walking ability and functional capacity between the two groups as shown in Figures 1, 2 and 4. However, there was a difference in the range of motion (Figure 3). In the study group this difference was clearly seen in the patients with myositis ossificans. It seems that the myositis ossificans interfered with the range of motion

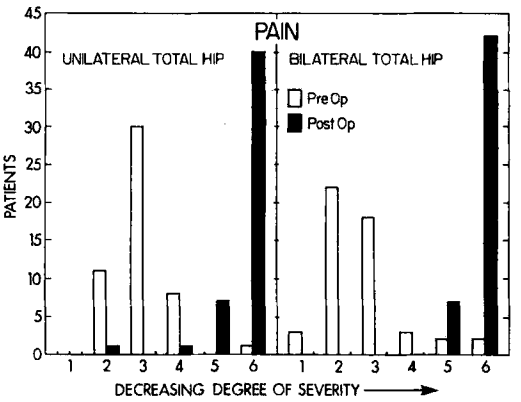

Figure 1. Preoperative pain as contrasted with postoperative pain in unilateral and bilateral total hip patients. Number one on the abscissa equals severe pain; patient cannot sleep or rest and a strong analgesic is required. Number six equals no significant pain.

Table 3. The number of years each patient has been followed postoperatively.

	Unilateral	Bilateral
2 years	26	26
3 years	19	18
4 years	4	6
5 years	1	0

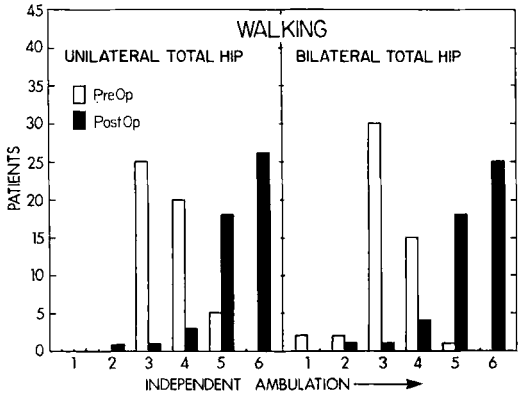

Figure 2. Preoperative walking ability as contrasted with postoperative walking ability in unilateral and bilateral total hip patients. Number one on the abscissa equals patient is bedridden. Number six equals no limp.

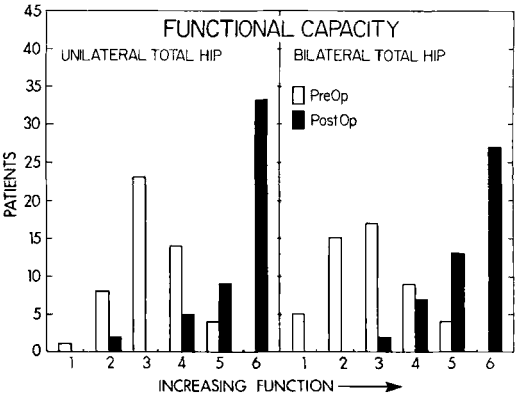

Figure 4. Preoperative functional evaluation as contrasted with postoperative functional evaluation in unilateral and bilateral total hip patients. Number one on the abscissa equals patient is disabled and requires assistance. Number six equals full physical labor and patient can participate in all sports or do heavy housework.

not only for the hip involved with the disease, but for the contralateral hip as well.

DISCUSSION

Many older patients would benefit from a bilateral reconstructive hip procedure and a total hip replacement seems the operation of choice. However, use of a general anesthetic places a serious stress on the vital systems of these patients. If such an undertaking could be performed under a single anesthetic with no increase in mortality and an awareness of the potential increase in complications, it would seem to be in the best interest of the patient to do so. An increase in morbidity or mortality is particularly disconcerting for a surgeon and these potentials must be weighed in the decision as to whether both procedures should be performed under a single anesthetic. We have been satisfied with bilateral total hip replacement under a single anesthetic. Patients undergoing bilateral total hip replacement did have an increased morbidity, but an increase in complications with such a procedure is to be expected. The complication of thromboembolic disease continues to be a major problem. Even though there is a great difference between our control and study group it is only double when evaluating a large consecutive series (Ritter et al. 1975). We have, however, had no increase in operative or postoperative mortality.

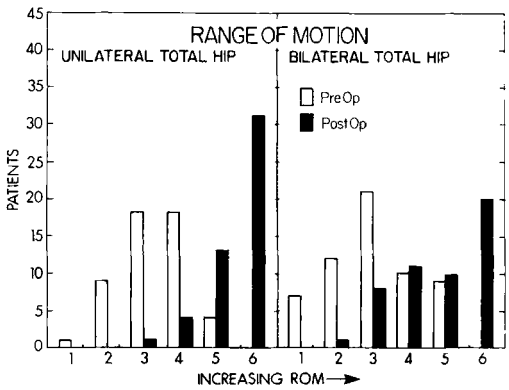

Figure 3. Preoperative range of motion as contrasted with postoperative range of motion in unilateral and bilateral total hip patients. Number one on the abscissa equals ankylosis with deformity. Number six equals almost normal range of motion.

In general, the study group did as well

as the control group, particularly following discharge, as noted in their postoperative hip ratings (Figures 1–4). Figure 3 reveals there is a difference in range of motion between the two groups which we feel is related to two factors. Firstly, the preoperative motion in the bilateral group was worse to begin with and secondly, there were more hips affected with myositis ossificans. Not only did the ectopic bone limit the hip involved, but the motion of the contralateral hip as well when not involved.

It is our feeling, therefore, that if a select team can be developed, whereby the operating time can be kept to a minimum, patients requiring bilateral total hip replacement will benefit from having this done as a simultaneous procedure, rather than in an operation of two stages, as long as the surgeon and patient are aware of the increased morbidity.

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