BILATERAL CHARNLEY ARTHROPLASTY AS A SINGLE PROCEDURE

A REPORT ON 400 PATIENTS

DAVID BRACY, B. M. WROBLEWSKI

From the Centre for Hip Surgery, Wrightington Hospital, Wigan

A series of 400 patients (average age 57.7 years) with bilateral low-friction arthroplasties of the hip has been reviewed. Comparison was made with similar unilateral operations. The results showed that the bilateral arthroplasties can be carried out as a single operation without higher risk of local or general complications. However, this excludes the incidence of pulmonary embolism which is higher for the bilateral replacements.

Excellent long-term results of the Charnley low friction arthroplasty have extended the indications for using this procedure. The specialised nature of the Hip Centre had allowed a number of patients to undergo bilateral arthroplasty at a single operation. There has been no large series of such operations reported to date. Lipscomb (1965) discussed reconstructive operations of the hip for bilateral disease in 349 patients and mentioned several bilateral osteotomies performed at the same time. The 50 patients undergoing bilateral hip replacement in this unit reported previously by Jaffe and Charnley (1970) are included in the present study. Head and Paradies (1977) reported that ipsilateral hip and knee replacement in three patients required an average operating time of four hours and 40 minutes. This time included the change-over and redraping between operations.

This paper presents the results found in this unit with patients undergoing bilateral hip replacement at a single operation.

MATERIAL AND METHOD

The study covers the period between June 1967 and February 1978. During this time approximately 13 000 low friction arthroplasties have been performed of which 405 were bilateral (3.1 per cent of patients, 6.2 per cent of all arthroplasties).

The bilateral operation was only considered when both hips were symptomatic enough to warrant replacement; when the general health of the patient was assessed to be satisfactory; and when technical problems presented could be easily solved by the surgeon. The decision to proceed with the second side was always taken towards the end of the first operation in consultation with the anaesthetist. Steroid medication was a contra-indication to bilateral procedures.

The most symptomatic side was always operated upon first. This

provided maximal benefit for the patient if it was decided not to proceed with the second side. All operations were carried out in a clean-air enclosure. The 10 minutes required to complete the change-over between the two sides has made this routine two operations. The records of five patients could not be traced, leaving a group of 400 for analysis.

Table 1. The aetiology of the hip condition in 400 patients given bilateral arthroplasties

Diagnosis	Number of hips	Percentage of total
Primary osteoarthritis	600	75
Rheumatoid arthritis	64	8
Congenital subluxation or dislocation	40	5
Idiopathic protrusio acetabuli	30	3.75
Osteoarthritis secondary to Perthes' disease	14	1.75
Ankylosing spondylitis	12	1.5
Epiphyseal dysplasia	10	1.25
Quadrantic head necrosis	10	1.25
Still's disease	6	0.75
Paget's disease	4	0.5
Slipped upper femoral epiphysis	3	0.38
Old sepsis	3	0.38
Coxa valga	2	0.25
Psoriatic polyarthritis	2	0.25
Total	800	100

D. Bracy, FRACS, Orthopaedic Surgeon, 376 Albert Street, East Melbourne, 3002, Australia.

B. M. Wroblewski, FRCS, Consultant Orthopaedic Surgeon, The Centre for Hip Surgery, Wrightington Hospital, Wigan, Lancashire WN6 9EP, England.

Requests for reprints should be sent to Mr B. M. Wroblewski.

© 1981 British Editorial Society of Bone and Joint Surgery 0301-620X/81/3064-0354 \$2.00

Table II. Previous operations in 49 patients

Type of operation	Number of hips
Intertrochanteric osteotomy	24
Cup arthroplasty	13
Psoas release	4
Shelf procedure	3
Unspecified	3
Ring arthroplasty	1
Voss procedure	1

Blood loss at operation was measured by weighing the swabs. The method is simple and convenient but does not take into account the blood on the drapes, in the tissues, or the tissue content of the swabs, and does not allow for any apparent loss during the drying effect of the clean-air enclosure. For the 400 patients the average duration of anaesthesia was 157 minutes and of the operation 137 minutes. The average blood loss during operation was 466 millilitres and that for the drainage after operation was 810 millilitres. The average amount of blood transfused in the 400 patients was 2.3 units.

The management after operation and the rate of mobilisation was no different from that of unilateral

Table III. Early general complications in the group of 400 patients after operation

Type of complication		Number of patients	Per cent	Average age (years)
Vascular	Deep vein thrombosis	78	19.5	59.8
	Pulmonary embolism: non-fatal	46	11.5	
	fatal	6	1.5	
	Cerebrovascular accidents } non-fatal	5	1.25	
	Myocardial infarction	1	0.25	
Genito-urinary	Infection	23	5.75	59.6
	Retention—requiring catheter only	19	4.75	
	resection of prostate	3	0.75	
	Reversible renal failure	1	0.25	
Pulmonary	Infection	10	2.5	60
	Pneumothorax	1	0.25	
Abdominal	Paralytic ileus or acute gastric dilatation	7	1.75	62
Neurological	Lateral popliteal palsy } all fully Ulnar neuritis } recovered	5	1.25	61
Metabolic	Acute gout	5	1.25	63

RESULTS

There were 237 females and 163 males in the group (a ratio of 1.5:1) and the average age was 57.7 years (range 25 to 79 years).

The condition leading up to hip replacement was recorded (Table I). Forty-nine hips (6.13 per cent) had had previous operations (Table II). Four hundred and seventy-nine (60 per cent) of the operations were carried out by consultants, and most of the remainder by the senior residents. The supine lateral approach was used with routine trochanteric osteotomy in all patients. Several methods of trochanteric reattachment were used: a double and a single wire; double wire with a compression spring; or a cruciate wire system (Boardman, Bocco and Charnley 1978) with or without the Charnley staple clamp (Charnley 1979).

arthroplasties (Boardman *et al.* 1978) and the average time spent in hospital was 27.6 days. Early general complications in the group of 400 patients after operation are given in Table III. Early local com-

Table IV. Late complications found in 760 hips

Type of complication	Number of hips	Percentage of total
Trochanteric non-union	45	5.92
Deep sepsis	3	0.39
Fractured stem	7	0.92
Revision for loosening	2	0.26
Dislocation	1	0.13

plications related to the 800 arthroplasties included: haematomata and delayed wound healing (12 hips); deep sepsis (three hips); and peroperative dislocation (three hips).

Six of the 400 patients died in hospital, 14 failed to attend the follow-up, leaving 380 for analysis with an average follow-up of 2.3 years (range 1 to 10 years). Complications recorded during the follow-up are shown in Table IV.

DISCUSSION

Bilateral arthroplasty as a single operation in a fit patient is attractive especially if both hips are equally troublesome. However, the disadvantage of a possible higher incidence of complications in the period after such an operation must be carefully considered. Because of the relatively large number of patients, the study allows an authoritative analysis of the risk involved. The average age (55.7 years), the sex ratio (1.7 females : 1 male), the average operating time (139 minutes) and the amount of blood transfused (2.2 units) of the 194 patients who had no complications at all, did not differ significantly from the whole group. It is felt, therefore, that none of these is significant in contributing to the complications. However, the incidence of pulmonary embolism is greater than that for unilateral procedures performed in this unit over the same period.

In a study by Johnson and Charnley (1979), which

also partly covered the present series, and which included 7959 hips, the incidence of fatal pulmonary embolism was 1.05 per cent as compared with 1.5 per cent in this study, whereas the incidence of non-fatal pulmonary embolism was 7.89 per cent compared with 11.5 per cent here. This suggests that bilateral simultaneous low-friction arthroplasties carry a higher risk of pulmonary embolism but the risk is lower than if the patients were exposed to twice the risk with two separate operations. During the operations the volume of blood transfused was much less than the blood lost. This was a deliberate policy based on the theory that transfused blood may in some way contribute to thromboembolic complications.

The overall rate of deep-infection was 0.63 per cent. In single operations this was 0.53 per cent (four in 751 cases). There were no infections in 64 hips with rheumatoid arthritis and one case of sepsis in 49 cases of conversion from failed operations of the hip (2.04 per cent). Therefore the combined early and late rate of deep sepsis is comparable to 0.8 per cent presented by Van Niekerk and Charnley (1977). The dislocation rate was 0.5 per cent (four cases). Three of these were in the peroperative period and were reduced under the same general anaesthetic. One occurred late, became recurrent and required subsequent revision. Trochanteric non-union of 5.92 per cent compares favourably with previous reports (Boardman *et al.* 1978).

REFERENCES

- Boardman KP, Bocco F, Charnley J. An evaluation of a method of trochanteric fixation using three wires in the Charnley low friction arthroplasty. *Clin Orthop* 1978;132:31-8.
- Charnley J. *Low friction arthroplasty of the hip. Theory and practice*. Berlin: Springer-Verlag, 1979:276-82.
- Head WC, Paradies LH. Ipsilateral hip and knee replacement as a single surgical procedure. *J Bone Joint Surg [Am]* 1977;59-A:352-4.
- Jaffe WL, Charnley J. Bilateral Charnley low friction arthroplasty as a single operative procedure. *Wrightington Hospital Internal Publication*, No. 31, 1970.
- Johnson R, Charnley J. Hydroxychloroquine in prophylaxis of pulmonary embolism following hip arthroplasty. *Clin Orthop* 1979;144:174-7.
- Lipscomb PR. Reconstructive surgery for bilateral hip-joint disease in the adult. *J Bone Joint Surg [Am]* 1965;47-A:1-30.
- Van Niekerk GA, Charnley J. Post-operative infection after Charnley low friction arthroplasty of the hip. *Wrightington Hospital Internal Publication*, No. 68, 1977.