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BLOOD LOSS AND OPERATION TIME IN THE CHARNLEY LOW FRICTION ARTHROPLASTY

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Review of 181 patients undergoing 194 Charnley low friction arthroplasties has shown that the average time taken for primary surgery was 65 minutes. The operative blood loss was 192 ml and postoperative drainage 437 ml.

In conversion from failed hip surgery the blood loss was 260 ml at operation with an average drainage of 610 ml. The operative time was 87 minutes on average.

Revision of failed hip replacement was carried out in an average time of 101 minutes. Average operative blood loss was 510 ml and postoperative drainage 680 ml.

The findings show that criticism suggesting that detachment of the greater trochanter during total hip replacement increases operative time and blood loss is unfounded.

Key words: blood loss; low friction arthroplasty; operative time; trochanteric osteotomy

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The Charnley low friction arthroplasty using the lateral approach with elevation of the greater trochanter is a time proven surgical technique which has given excellent results over the past 17 years. The detachment of the trochanter with its subsequent reattachment has met with a certain amount of criticism.

An increase in operative time and excessive blood loss at surgery (Wiesman et al. 1978) were two of the objections. However, there can be no doubt that osteotomy of the trochanter gives a much better exposure, especially in difficult and revision cases, and allows a better preparation of the acetabulum and the medullary canal and accurate positioning of the components. This almost certainly helps to avoid early (Ali Khan & O'Driscoll 1977) and late (Wroblewski 1979a) complications.

The purpose of this paper is to present the results of a series of 194 consecutive low friction arthroplasties performed in 181 patients in order to answer the criticisms that osteotomy of the greater trochanter at the time of the exposure increases the blood loss and prolongs the time of surgery (Wiesman et al. 1978).

In order to reduce the number of variables a strict selection was used to include only the cases where one anaesthetist (G.B.) used the same method of premedication, induction and general anaesthesia and one surgeon (B.M.W.) performed the operation with only minor variations according to specific problems encountered. Because of this the series is relatively small and comprises only about 4 per cent of the total throughput of the Unit.

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MATERIAL AND METHOD

Case notes of patients that fulfilled the above criteria were reviewed and the relevant data extracted. The operation was performed through the lateral approach with detachment of the greater trochanter which was routinely reattached using the three-wire technique (Charnley 1979). On some occasions this was also supplemented with the Charnley staple-clamp applied in the antero-posterior direction (Charnley 1979).

Three drains were used routinely, inserted from inside out and brought out distally through the lateral aspect of the thigh. These drains were in all cases carefully placed so that there was one inside the joint round the prosthetic neck, a second behind the greater trochanter and a third in the subcutaneous fat – superficial to the deep fascia.

The deep fascia was sutured with a continuous locking polypropylene stitch. The subcutaneous tissues were gently compressed by a system of pressure pads (Charnley 1979) applied after skin closure with continuous nylon suture. Only a light Melolin dressing was used.

Blood loss at surgery was measured by weighing swabs individually after use. No irrigation or suction was used. The method has its limitations as it does not take into account the blood on gloves, instruments, drapes or "turkish towels" used to isolate the skin, or the "tissue content" (fat, marrow, cancellous bone) of the swabs.

Although all swabs were weighed immediately after use no allowance was made for any "drying effect" of the clean air enclosure.

Postoperative blood loss was estimated by direct measurement of the blood aspirated into three suction bottles which were routinely connected to a self-monitoring constant central suction apparatus.

Except for cases of revision surgery, all drains were removed at 48 hours.

No anticoagulants were used. The only routine medication was hydroxychloroquine sulphate as an anti-embolic agent.

Anaesthetic technique

Premedication: Fit adults up to the age of 60 years received a combination of Papaveretum and Hyoscine Hydrobromide (Omnopon-Scopolomine – Roche) and Promethazine Hydrochloride (Phenergan – May and Baker). Patients over 60 or those considered "poor risk" patients received a combination of Morphine, Promethazine Hydrochloride and Droperidol (Droleptan – Janssen).

Induction: In all patients this was done with Alphazalone/Alphadolone acetate (Althesin – Glaxo). The vocal cords and trachea were sprayed with 4 per cent Lignocaine and intubation carried out under Suxamethonium Chloride.

General anaesthesia was maintained with Nitrous Oxide, Oxygen and Halothane with Tubocurarine Chloride as a muscle relaxant.

Intermittent positive pressure closed circuit ventilation was used routinely.

The combination of Halothane and Tubocurarine usually resulted in a fall in blood pressure which if maintained did reduce the operative bleeding.

If the blood pressure returned to normal and the bleeding was not excessive no further action was taken; otherwise intravenous Trimetaphan Camsylate (Arfonad – Roche) 5 mg/cc was given intermittently, except in the poor risk patients. Blood pressure recording and electrocardiographic tracing were done routinely during surgery.

Intravenous infusion: During operation 500 to 1000 ml of Ringer lactate solution was administered. Postoperatively intravenous infusion of Haemocel and Ringer lactate was given. Blood was not given routinely unless specifically indicated.

The series

A total of 181 patients had 194 operations. There were 102 females and 79 males.

The age at the time of the operation was 63.3 years, mean range 21 to 84 years with 155 patients being between the ages of 51 and 80 years.

Primary surgery: There were 149 hips (77 per cent) in this group; 118 with primary osteoarthritis, 20 with osteoarthritis secondary to congenital dysplasia, subluxation or dislocation, 9 with rheumatoid arthritis and 2 with ankylosing spondylitis.

Conversion from failed hip surgery: In this group there were 26 hips (13 per cent); 9 intertrochanteric osteotomies, 6 with sequelae of fracture of the neck of the femur, 4 with prosthetic femoral head replacement, 3 with pseudoarthrosis, 2 with failed surgical fusion and 2 with old septic arthritis which had resulted in a sound bony fusion.

Revisions from failed hip replacement surgery: Nineteen hips (10 per cent) had revisions for a failed total hip replacement. Seven had a fractured stem changed, the others were revised either because of sepsis or loosening.

RESULTS

These are presented in tabular form (Table 1) for ease of comparison.

Table 1. Operative blood loss, postoperative drainage, total blood loss and operating time in the various groups of patients. The results of the study of Wiesman et al. (1978) are also shown

Primary surgery	149	Operative blood loss ml average & range	Postop. drainage ml average & range	Total blood loss ml average & range	Blood transfused ml average & range	Operating time min average & range
		190	480	670	353	64
Primary O.A.	118	15–930	50–1150	180–1350	0–1040	40–110
		210	490	700	338	69
Congenital dysplasia	20	50–390	130– 940	180–1190	0–1040	55– 95
		190	340	530	419	62
Rheumatoid arthritis	11	50–485	200– 655	345–1140	0–1040	45– 75
		197	437	633	370	65
		15–930	50–1150	180–1350	0–1040	40–110
Conversion from failed hip surgery	26					
Intertrochanteric osteotomy	9	230	513	743	404	88
Fractured neck of femur and sequelae	6	224	584	808	693	81
Femoral head replacement	4	297	635	932	520	95
Septic arthritis/Failed fusion	4	230	543	773	910	76
Pseudarthrosis	3	407	950	1357	1040	105
		260	610	870	713	87
		50–580	170–1300	390–1680	0–1040	60–120
Revision of failed hip replacement surgery	19					
		300	655	955	743	97
Change of fractured stem	7				0–1560	80–110
		625	690	1315	1170	107
Revision for other reasons	12				0–3120	75–150
		510	680	1190	967	102
		100–2500	300–1250	390–3500	0–3120	75–150
Wiesman et al. with				1820	2298	186
trochanteric osteotomy	12	–	–	1240–2600		145–240
Without trochanteric				1248	1602	156
osteotomy	12	–	–	520–2080		105–195

DISCUSSION

Expertise and the frequency with which an operation is performed will inevitably reduce the time of surgery. Anaesthesia also plays a very important role and judicious use of controlled hypotension will further reduce operative blood loss and contribute to an unobstructed view.

In the present series the operative blood loss in primary surgery was less than 200 ml and the postoperative drainage just over twice that volume. Total blood loss for this group was 633 ml average (range 180 to 1350 ml). Almost 40 per cent of patients in this group did not require blood transfusion.

With revisions from previous failed hip surgery the operative blood loss was slightly more than in cases of primary surgery and the postoperative drainage was also increased. This was certainly

due to more extensive dissection including removal of metal in some cases. The necessity for soft tissue dissection at the time of exposure resulting in increased blood loss is well illustrated by conversions from pseudoarthrosis. Even in this group three patients did not require blood transfusion.

In cases of revision of failed hip replacement surgery the operative time was similar to that for cases of conversion surgery. Blood loss in this group must obviously be higher because of more extensive dissection especially in cases of full scale revision for sepsis.

With a fracture of the femoral stem the cup was usually left unchanged (although carefully tested for signs of loosening) and with the method designed for the purpose (Wroblewski 1979b), the time of surgery and the blood loss was greatly reduced.

The obvious criticism of this study is that no control series has been carried out without a trochanteric osteotomy. Personal experience, however, would suggest that such a series would produce longer operative times and almost certainly increase blood loss, and although scientifically desirable, would not be justifiable morally.

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