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Girdlestone resection arthroplasty following failed surgical procedures

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Abstract We retrospectively reviewed 43 patients who had undergone Girdlestone resection arthroplasty of the hip after failed total hip replacement or failed operations for hip trauma between 1990 and 2002. The indications were peri-prosthetic infection, aseptic loosening, recurrent dislocation and failed internal fixation for femoral neck fractures. Twenty-five patients died with an overall mortality of 58%. Out of 18 survivors, four patients had a prosthesis re-implanted and were excluded from the study. In 14 surviving patients followed-up for a mean of 44.5 months, the average age was 76 years. Adequate pain relief was achieved in 12 patients and infection was controlled in all. They all needed walking aids. The overall patient satisfaction was 10/14. We observed that patients who had had resection arthroplasty following failed operations for hip trauma had a higher mortality than those for failed total hip arthroplasty. Girdlestone arthroplasty is still a viable option to salvage irretrievably failed hips presenting technical difficulties in medically compromised patients. Limb shortening and the inevitable need for a walking aid should be clearly explained to patients during the consenting process in order to avoid unrealistic expectations.

Résumé Nous avons examiné rétrospectivement 43 malades qui avaient subi une résection de la hanche (Girdlestone) après échec de prothèse totale ou d'intervention pour traumatisme entre 1990 et 2002. Les indications étaient l'infection périprothétique, le descellement aseptique, la luxation récidivante et l'échec de l'ostéosynthèse d'une fracture du col fémoral. Vingt-cinq malades sont morts, représentant une mortalité totale de 58%. Quatre malades avaient un ré-implantation secondaire de prothèse et ont été exclus de l'étude. Il y avait 14 survivants d'âge moyen 76 ans, suivis en moyenne pendant 44.5 mois. Le soulagement de la douleur était obtenu pour 12 malades, l'infection était contrôlée dans tous les cas, et tous les malades utilisaient des aides à la marche. Dix malades sur 14 étaient satisfaits. Nous avons observé que les malades qui avaient eu la résection après échec d'ostéosynthèse avaient une plus haute mortalité qu'après échec d'arthroplastie totale. L'arthroplastie par résection de la hanche (Girdlestone) est encore une option utile pour sauver des hanches irréversiblement détériorées chez des malades techniquement difficile et médicalement compromis. Le raccourcissement du membre et le besoin constant de l'aide à la marche devrait être bien expliqué aux malades pendant l'information en vue du consentement, afin d'éviter des attentes indues.

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Introduction

Patients with severe loss of bone stock, risk of recurrent infection or poor general condition [2, 4, 9, 11] may not be suited for further major interventions, especially one- or two-stage reimplantation after failed primary total hip replacement. In such cases, Girdlestone resection arthroplasty is considered to be an acceptable option.

In the majority of cases, the Girdlestone procedure is done as a last resort to salvage failed primary total hip replacements and revisions rather than as an alternative option to revision. There is very little information available about the functional outcome of the Girdlestone operation in failed operations for hip trauma. The aims of this

study were to assess the long-term outcome after Girdlestone resection arthroplasty of the hip irrespective of the cause.

Methods and materials

Between 1990 and 2002, the case notes and theatre charts of 43 patients who had undergone Girdlestone resection arthroplasty were reviewed retrospectively. The operations were performed at a District General Hospital (Falkirk and District Royal Infirmary, Falkirk, Scotland, UK) and a University Teaching Hospital (Ninewells Hospital, Dundee, Scotland, UK). The Girdlestone procedure was performed in 21 patients following failed total hip replacements whereas 22 patients had the index operation after failed operations for hip fractures. The indications were sepsis after a hip arthroplasty in 23 cases, aseptic loosening of the prosthesis in nine, recurrent dislocation of a hip arthroplasty in three and failed internal fixation of a femoral neck fracture in eight. The final subjective outcome was evaluated by telephone questionnaire performed by a single assessor. Subjective assessment was recorded in terms of pain, leg length discrepancy, use of a walking aid, walking ability and overall satisfaction. Ages ranged from 57 to 94 years with a mean age of 76.3 years. Ten out of 14 patients were women. There was predilection for the right hip. Patients were followed-up for an average of 44.5 (6–156) months.

Results

Twenty-five patients died during the follow-up period with an overall mortality of 58% (Table 1). Approximately half of the patients died in the first year following their operation.

Details of the functional outcome of all surviving patients is described in Table 2. In 14 surviving patients, pain relief was achieved in 12, with mild to no pain in the hip. In all patients, infection was controlled. All patients needed some kind of walking aid, ranging from sticks ($n=2$) and a walking frame ($n=8$) to being wheelchair bound ($n=4$). Overall, ten patients expressed their satisfaction in the Girdlestone procedure with some reservations.

Thirteen patients died following a Girdlestone procedure in the Teaching Hospital while 12 patients died after the procedure in the District General Hospital. Mean patient age in the teaching hospital was 75.1 years with a 69% female preponderance. A mean age of 80.6 years with an 83% of female distribution was found in the District General Hospital. The mortality was 59% in the University Teaching Hospital with an operation–death interval varying from 3 weeks to 104 months. The mortality rate in the District General Hospital was 57% with an operation–death interval varying from 2 weeks to 73 months.

Table 1 Mortality patterns in Girdlestone hips following failed total hip replacement (THR) and failed treatment of hip fractures. *Hemi.* hemi-arthroplasty, *R* right, *L* left, *F* female, *M* male, *THR* total hip replacement, *DHS* dynamic hip screw

Number	Age	Gender	Side	Indication for Girdlestone procedure	Operation to death duration (months)
1	56	F	R	Sepsis THR	14
2	84	F	R	Sepsis THR	104
3	68	F	L	Sepsis THR	72
4	90	M	L	Sepsis THR	10
5	68	M	R	Recurrent dislocation THR	0.75
6	76	F	L	Sepsis THR	1.5
7	72	F	L	Sepsis THR	38
8	82	F	R	Sepsis THR	5
9	85	M	L	Aseptic THR	6
10	64	F	L	Aseptic THR	7
11	76	F	L	Failed DHS	13
12	83	F	R	Sepsis hemi.	51
13	88	F	L	Failed DHS	26
14	82	F	L	Failed DHS	4
15	82	M	R	Failed screws	3
16	54	M	L	Failed DHS	2
17	88	F	L	Failed DHS	7
18	82	F	R	Aseptic hemi.	38
19	91	F	R	Failed DHS	38
20	89	F	R	Sepsis hemi.	1
21	61	F	L	Sepsis hemi.	46
22	89	F	L	Failed DHS	73
23	79	F	R	Sepsis hemi.	0.5
24	75	M	R	Aseptic hemi. with recurrent dislocation	51
25	83	F	L	Aseptic hemi.	31

Discussion

It is interesting to note that there are no published studies comparing the outcome of retained septic implants to salvage excision arthroplasty. No studies have been published comparing the functional outcome of the Girdlestone operation in failed total hips to those following hip trauma.

With recent advances in orthopaedic Surgery, Girdlestone resection arthroplasty is rarely indicated as a primary procedure. As a salvage procedure, it should not be considered as an alternative to one- or two-stage reimplantation. Repeated surgical procedures, prolonged morbidity, intercurrent illnesses and repeated invasive investigations can lead to depression and dissatisfaction in patients with infected prostheses. These patients are sometimes not suitable candidates for revision surgery. Depression, poor general health, senility, weak upper limbs and involvement of other joints make the prognosis poor, especially following a Girdlestone operation.

Table 2 Details of functional outcome in patients following Girdlestone arthroplasty. *Hemi.* hemi-arthroplasty, *R* right, *L* left, *F* female, *M* male, *THR* total hip replacement, *Contr.* controlled

Number	Age	Gender	Side	Indication	Pain	Infection	Walking aids	Satisfaction	Follow-up (months)
1	72	F	R	Aseptic THR	None	–	Zimmer frame	Satisfied	29
2	62	F	R	Sepsis THR	Moderate	Contr.	Chair bound	Very dissatisfied	19
3	83	F	R	Sepsis THR	Slight	Contr.	Chair bound	Neither satisfied, nor satisfied	22
4	70	M	R	Sepsis THR	None	Contr.	2 Sticks	Satisfied	156
5	79	F	R	Sepsis hemi.	None	Contr.	Zimmer frame	Satisfied	53
6	80	F	R	Aseptic THR	None	–	Zimmer frame	Satisfied	96
7	88	F	L	Sepsis hemi.	Mild	Contr.	Zimmer frame	Satisfied	96
8	81	F	L	Aseptic THR	Slight	–	Zimmer frame	Satisfied	9
9	94	F	R	Sepsis hemi.	Mild	Contr.	Chair bound	Satisfied	6
10	81	F	L	Recurrent dislocation hemi.	Slight	–	Chair bound	Neither satisfied, nor satisfied	9
11	86	F	R	Sepsis THR	Marked	Contr.	Zimmer frame	Dissatisfied	9
12	74	M	R	Sepsis with recurrent dislocation hemi.	None	Contr.	Zimmer frame	Satisfied	14
13	62	M	R	Sepsis hemi.	None	Contr.	Zimmer frame	Satisfied	36
14	57	M	R	Sepsis THR	None	Contr.	1 Stick	Very satisfied	69

Most previous studies assessed the long-term outcome following Girdlestone arthroplasty in infected total hip replacements and aseptic loosening. The results are contradictory. In this study, pain relief was achieved in 12/14 patients with mild to no pain in the hip. All patients had their infection controlled, and all needed some kind of walking aid. Overall, ten patients expressed their satisfaction in the Girdlestone procedure with some reservations. These results are comparable to previously published studies [1, 3, 5, 6, 9, 10].

Mortality is reported between 7% and 62% following Girdlestone operation for infected total hip replacements [6]. An overall 58% mortality was noted in this series irrespective of the indication for the procedure. The difference between previously published studies and this series could be explained on the basis of associated co-morbidities, poor general health and higher age. We observed a higher mortality in Girdlestone operation following failed treatment of hip fractures in contrast to failed total hip replacements.

The reported results of Girdlestone arthroplasty are not uniform. Satisfactory results have been reported by some authors [1, 3, 5, 6, 9, 10] whereas a poor outcome was noticed by others [2, 7, 13]. Younger patients have higher functional demands and higher expectations. This suggests that the Girdlestone operation should not be considered as a primary option for such patients [2]. Old patients have limited functional demands and lower expectations so that there may be a fair-to-good outcome. The results were significantly poorer in women, particularly older ones, as reported by Grauer et al. [9]. The mean age in our study was 76.3 years.

Deep infection complicates between 1% and 2% of total hip replacements [2, 4, 6]. Clegg advocated complete removal of all the cement remnants in order to achieve eradication of infection [7], but we agree with the views of others that small amounts of retained cement do not seem

to influence wound healing after resection arthroplasty [1, 4, 13]. We achieved 100% infection control in the surviving patients, similar to Mallory [10] and Ahlgren et al. [1]. Control of infection varies between 73% and 100% cases postoperatively [3, 7, 9, 13].

Grauer et al. [9] reported a positive correlation between shortening and the level of resection. Patients with less shortening showed better walking and function although the difference was not statistically significant. As our study was conducted by telephone questionnaire, it was impossible to know the exact amount of limb shortening. Most patients reported their limb shortening as approximately 2-in., based on their shoe raise.

Walking aid use should not be considered as a negative assessment. Limb shortening is inevitable, and the associated gluteus medius insufficiency magnifies the need for walking assistance. The degree of shortening is dependent on the amount of bone lost from the proximal femur and the nature of the scar tissues around the hip [9]. None of the patients were able to walk even short distances in the home without aids.

Overall satisfaction is a very sensitive indicator of long-term functional outcome, indicating the patient's adjustment to the altered state of the hip [12]. Previous studies have reported that subjective satisfaction varies between 15% and 100%. In this series the overall contentment, with some reservations, was 10/14 (71%). This is comparable to the findings of Bourne et al. [4] and Castellanos et al. [6] and is better than those of Petty and Goldsmith [13] and Esenwein et al. [8].

We noticed a high mortality after this procedure in both District General and Teaching Hospitals. The case mix and functional outcomes were comparable in the two of hospitals. Mortality was higher in the failed fracture group (68%) compared to failed primary total hip replacements (47%). It is interesting to note that all the six surviving

patients in the failed hip fracture group were failed hemiarthroplasties.

The number of cases in this series was small in spite of aggregating data from two hospitals over 13 years. Our results are comparable to other previously published studies. High mortality is inevitable in such patients. The case notes of most of the deceased patients were destroyed, resulting in loss of some important information. In the surviving patients, no clear pre-operative status or score was documented in the case notes. No clinical follow-up was made post-operatively.

The primary goal of the Girdlestone operation is pain relief and control of infection. We believe that the decision between revision and resection should not be taken lightly, but there will always be some cases where a Girdlestone procedure is the only viable option. Such patients must be warned to expect 2–3 in. of limb shortening and the invariable need for walking aids post-operatively. This should be explained to the patient clearly in the decision-making and consenting process. Future studies with more patients from multiple centres may reveal more meaningful results.

This study confirms that the Girdlestone procedure can control infection and pain following failed hip replacement or failed hip fracture treatment. We believe that the associated high mortality and poor functional outcome reflects the higher age group and poor general health of patients who were unfit for re-implantation surgery. There was no difference between the long-term outcomes of the Girdlestone procedure performed at a District General Hospital compared with a University Teaching Hospital.

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