GIRDLESTONE'S PSEUDARTHROSIS AFTER REMOVAL OF A TOTAL HIP PROSTHESIS ; A RETROSPECTIVE STUDY OF 40 PATIENTS

by E. A. T. DE LAAT, J. J. J. VAN DER LIST, J. R. VAN HORN and T. J. J. H. SLOOFF

In case of irreversible failed total hip replacement, a Girdlestone operation is sometimes the obvious solution : excision of cement and prosthesis without attempting a new hip replacement. Reasons for not implanting a new prosthesis are severe loss of bonestock, the risk of recurrent infection, or poor general condition. A clinical follow-up study was performed on 40 patients who underwent a Girdlestone hip procedure using the following criteria : pain, walking distance and the use of a walking support. The mean follow-up was 4.9 years. Postoperatively 33 of 40 patients had less pain compared with the situation before the operation. Sixteen patients walked more than 500 m, 13 patients walked 200-500 m and 11 patients walked less than 200 m, of whom 4 were wheelchair bound. The objective result was good in 40% of the patients, moderate in 42.5%, and bad in 17.5%. Subjectively 62.5% were satisfied. A Girdlestone arthroplasty after loosening of the hip prosthesis was a satisfying solution in most cases.

Keywords : Girdlestone operation ; excision arthroplasty ; pseudoarthrosis coxae ; sepsis.
Mots-clés : opération de Girdlestone ; ablation de prothèse ; sepsis.

SAMENVATTING

E. A. T. DE LAAT, J. J. J. VAN DER LIST, J. R. VAN HORN en T. J. J. H. SLOOFF. Een Girdlestone-heup na verwijdering van de totale heupprothese : een retrospectief onderzoek van 40 patiënten.

Bij een onherstelbaar gefaalde heuparthroplastiek moet soms gekozen worden voor een Girdlestone-operatie ; verwijdering van cement en prothese zonder nieuwe gewrichtsvervanging na te streven. Redenen hiervoor zijn onvoldoende dragend bot, risico op recidiefinfectie of slechte algemene conditie.
Bij 40 patiënten met een Girdlestone-heup werd klinisch na-onderzoek gedaan aan de hand van de volgende criteria : pijn, loopafstand en gebruik van hulpmiddelen. De follow-up was gemiddeld 4,9 jaar. Drieëndertig van de 40 patiënten gaven postoperatief duidelijk pijnvermindering aan. Zestien patiënten liepen meer dan 500 m. Dertien patiënten liepen 200-500 m en 11 patiënten liepen minder dan 200 m, waarvan er 4 rolstoelgebonden waren.
Het objectieve resultaat was in 40% goed, in 42.5% matig en in 17.5% slecht. Subjectief waren 62.5% tevreden. Een Girdlestone-situatie na een losgelaten heupprothese is in de meeste gevallen een bevredigende oplossing.

RÉSUMÉ

E. A. T. DE LAAT, J. J. J. VAN DER LIST, J. R. VAN HORN en T. J. J. H. SLOOFF. Résection de la hanche après ablation de prothèse totale. Analyse rétrospective de 40 cas.

En cas d'échec irréversible d'une arthroplastie totale de hanche, une résection à la Girdlestone peut être indiquée. Par intervention de Girdlestone les auteurs entendent l'ablation du ciment et de la prothèse, sans chercher à réaliser une nouvelle articulation.
L'absence de matériel osseux suffisant pour une réimplantation, le risque septique ou l'état général précaire sont les principales indications.

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Quarante malades, traités de cette manière, furent évalués en tenant compte des paramètres suivants : douleur, périmètre de marche et utilisation de béquilles.
Le recul moyen est de 4,9 ans. Dans 33 cas les douleurs étaient nettement diminuées. Seize patients avaient un périmètre de marche de 500 m, 13 de 200 à 500 m et 11 de moins de 200 m ; 4 étaient condamnés au fauteuil roulant.
Le résultat objectif est bon dans 40% des cas, moyen dans 42,5% et mauvais dans 17,5% ; 62,5% des patients étaient satisfaits.
L'intervention de Girdlestone représente un rattrapage possible après échec d'arthroplastie totale et donne un résultat acceptable dans la majorité des cas.

INTRODUCTION

During the last 25 years hip joint arthroplasty has greatly improved. The overall success rate ranges from 88 to 94% in 10-year follow-up studies (5, 14, 16, 19). In the Netherlands the number of these operations doubled in the period from 1977 until 1989 and is performed an estimated 10,000 times annually (18). Many patients are relieved of severe pain and are saved from disability.
Nevertheless, this success is not without complications. The duration of the prosthesis depends on biomechanical design, the kind of metal used, operative technique, cement technique, the weight of patient, gender, age, the patient's activity level, follow-up and early recognition of focal infections (17).
The increase in revision operations is greater than the increase in primary total hip operations (18). In the coming years more people with a hip prosthesis will be re-operated. In general these reoperations are technically more difficult, show more complications and less good results. Moreover, in a few cases, it is not possible to operate on these "failed hips" again, due to massive loss of available bonestock, risk of recurrent infection, or poor general condition. In these cases of failed hip arthroplasty and impossibility of reimplantation, the Girdlestone operation offers a solution. The hip prosthesis and cement are removed without attempting a new joint replacement.
In 1943 Gathorne Robert Girdlestone (1881-1950), orthopedic surgeon in Oxford, introduced this operation for the treatment of septic coxitis. It usually involved gunshot wounds secondarily infected by tubercle bacilli. His operation consisted of wide excision of the abductors and removal of the greater trochanter and femoral head.
With the widespread introduction of the total hip arthroplasty in the 1960's this operation was reintroduced as a salvage procedure for the irreversible failed total hip replacement. Because of Girdlestone's major interest in resection of the total hip joint for a variety of conditions, it is appropriate to use his eponym as a generic name for such operations (6). Other names are : excision arthroplasty, pseudoarthrosis coxae, resection arthroplasty or head-neck resection. In published series, widely divergent results can be found (1, 2, 6, 7, 8, 15). However, comparison of the studies is difficult because of lack of uniform criteria. The intention of this retrospective study is to assess the clinical results of a series of 40 Girdlestone arthroplasties.

PATIENTS AND METHODS

Between October 1984 and July 1986, 40 patients (28 women and 12 men) were examined after a unilateral Girdlestone procedure. The mean age was 61.4 years (range 26 to 80 years) at the time of the removal of the prosthesis. From the moment of removal, the mean follow-up was 4.9 years (range 2 to 15 years). The entire prosthesis with all cement was extracted and a thorough debridement was always done. When there was an infection or when infection could not be excluded, gentamycin-PMMA-beads were implanted and removed after 2 weeks. Postoperatively all patients underwent 6-weeks traction by means of a tibial pin to achieve fibrosis between the acetabulum and trochanter. After this period, patients started partial weight-bearing and were discharged. All patients were examined by the same person using the following criteria : elimination of infection, walking distance and the use of a walking support.

RESULTS

According to Hamblen there are two criteria to assess the results of the Girdlestone operation : elimination of infection and the residual function (7).

In 22 out of 23 patients with infected prostheses the infection was eliminated. One patient had a persistent fistula without general features of sepsis.

For scoring the quality of residual function, we judged the pain in the ipsilateral region, the walking distance and the support required for walking (table I). Before the operation all patients had pain. At follow-up 26 of 40 patients had no pain, 8 patients suffered from moderate pain, and 6 complained of severe pain. Thirty-three patients (82.5%) had less pain postoperatively. Sixteen patients could walk more than 500 m, 13 patients walked 200-500 m and 11 patients walked less then 200 m, of which 3 only walked indoors and 4 were wheelchair bound.

Indications for not implanting a new prosthesis were : severe loss of bonestock (24 patients), the risk of recurrent infection (8 patients), and poor general condition (7 patients). Three did not want a new prosthesis.

Table I. — Girdlestone operation in 40 patients : assessment of the objective results judging the residual function of the hip joint by scoring pain, walking distance and the support required for walking

Results	Number of patients	Qualification
no pain walking > 2000 m walking 500-2000 m 1 cane or crutch	7 9	"good"
moderate pain walking outdoors 200-500 m walking outdoors < 200 m	13 4	"moderate"
much pain walking only inside or wheelchair bound	3 4	"bad"
	40	

DISCUSSION

Compared with other series, the Girdlestone operation in our patient group shows a high percentage of infection eliminated (1-4, 15). The evidence that retained cement increases the risk of chronic infection is inconclusive (13).

The number of satisfied patients differ among various authors (1, 2, 6-8, 12, 15). The problem is that some patients compare the results of the operation with the situation before the operation while others compare it with a good functional total hip prosthesis or with a normal hip. According to Campbell, 40% of the patients considered themselves improved as compared to the state before arthroplasty, while 88% were better than before pseudoarthrosis (3). Alleviation of pain was the most important contribution to the subjective satisfaction (8, 12, 13).

Fig. 1. X-ray of a patient after a Girdlestone-hip procedure who has a "good" functional result : he walked more than 500 m with one stick and he had no pain. Because of bonestock loss in the proximal femur, a revision operation was not possible.

Figure 1 is an X-ray of a Girdlestone hip repair of one of our patients. After aseptic loosening, it was impossible to insert a new prosthesis because of decreased bonestock of the proximal femur. This patient was classified as "good" : he had no pain, walked more than 500 m with one cane and he had no infection.
Sometimes pain persisted after the operation. To Hamblen "bony impingement" was the most important reason for this persisting pain (5). "Bony impingement" is an impaction of the pelvis and the proximal femur, a finding we could not confirm in our study. One of our patients showed this bone contact radiologically (fig. 2), whereas he was very satisfied, he had no pain and could walk more than 2 km.

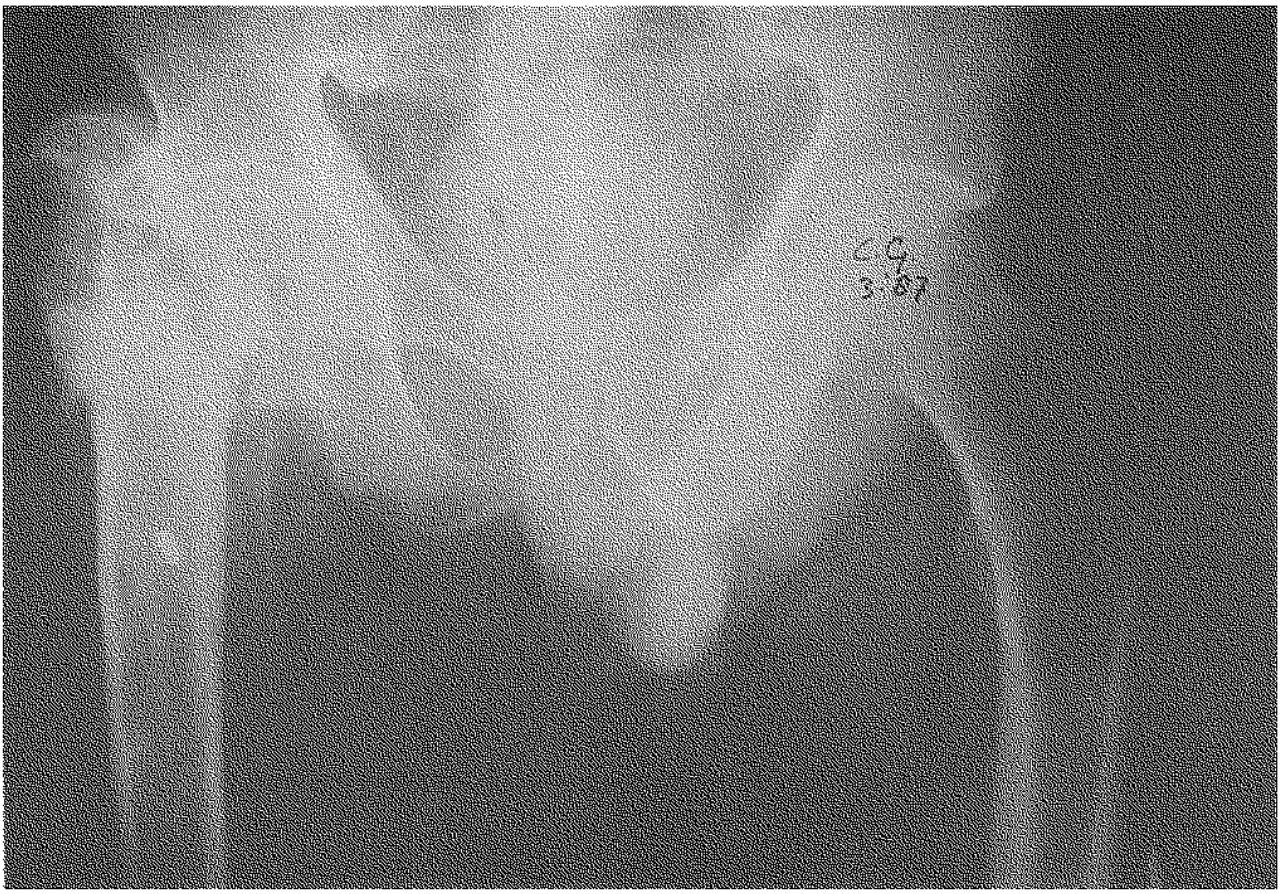

Fig. 2. — "Bony impingement" : the prominent rim of the acetabulum touches the lesser trochanter (right).

All patients had a leg-length discrepancy, with a mean shortening of 4.5 cm (range 1.5 to 9 cm). Traction seemed to have little influence on leg-length discrepancy. Usually they needed a shoe insert. According to Duchenne a limp is inevitable. A computerized biomechanical analysis of gait in patients with a unilateral Girdlestone arthroplasty showed that the affected limb was used as a strut and that there had been a mean reduction of 10% in the duration of the standing phase (11). Kantor *et al.* believe that resection arthroplasty results in disability because of the energy consumption required for ambulation (10). They performed oxygen consumption studies and found an average

consumption of 264% of normal. This was larger than recorded in patients with above-knee amputation using an orthesis.

CONCLUSIONS

Findings for 40 total hip arthroplasties, on which revision operations were not possible, are described. Severe loss of bonestock, the risk of recurrent infection, or poor general condition are indications for not implanting a new prosthesis. The obvious solution was a Girdlestone operation, excision of cement and prosthesis without attempting a new hip replacement.

A clinical follow-up study, scoring pain, walking distance, and the permanent use of a crutch, was performed on 40 patients. The objective result was 40% good, 42.5% moderate and 17.5% bad. Subjectively, 62.5% were satisfied. The limited walking distance and the permanent use of a cane were the greatest objections of our patients.

We can conclude that, in cases of irreversible failed total hip replacement, the Girdlestone operation shows satisfying results.

REFERENCES

1. AHLGREN S. A., GUDMUNDSON G., BARTHOLDSON E. Function after removal of a septic total hip. *Acta Orthop. Scand.*, 1980, *51*, 541-45.
2. BOURNE R. B., HUNTER G. A., RORABECK C. H., MACNAB J. J. A six-year follow-up of infected total hip replacement managed by Girdlestone's arthroplasty. *J. Bone Joint Surg.*, 1984, *66-B*, 340-43.
3. CAMPBELL A., FITZGERALD B., FISHER W. D., HAMBLEN D. C. Girdlestone's pseudoarthrosis for failed total hip replacements. *J. Bone Joint Surg.*, 1980, *62-B*, 441-42.
4. CLEGG J. The results of the pseudoarthrosis after removal of the infected total hip prosthesis. *J. Bone Joint Surg.*, 1977, *55-B*, 298-301.
5. DOBBS H. S. Survivorship of total hip replacements. *J. Bone Joint Surg.*, 1980, *62-B*, 168-73.
6. GIRDLESTONE G. R. Acute pyogenic arthritis of the hip. *Clin. Orthop.*, 1982, *170*, 3-7.
7. HAMBLEN D. L., FISHER W. D. *Excision arthroplasty as a salvage procedure in failed total hip replacements.* In : Ling R. S. M., *Complications of total hip replacement*, Churchill Livingstone, London, 1984, p. 16, 18, 272.
8. HAW C. S., GRAY D. H. Excision arthroplasty of the hip. *J. Bone Joint Surg.*, 1976, *58-B*, 44-47.
9. HUNTER G. A. Results of reinsertion of a total hip prosthesis after sepsis. *J. Bone Joint Surg.*, 1979, *61-B*, 422-23.
10. KANTOR G. S., OSTERHAMP J. A., DORR L. D., FISHER D., PERRY J., CONATY J. P. Resection arthroplasty following infected total hip replacement arthroplasty. *J. Arthr.*, 1986, *1*, 83-89.
11. KELLY I. G., BROWN T. R. M. A biomechanical analysis of gait on patients with unilateral Girdlestone arthroplasty of the hip. *J. Bone Joint Surg.*, 1980, *61-B*, 535-36.
12. MARCHETTI P. G., TONI A., BALDINI N. *et al.* Clinical evalution of 104 hip resection arthroplasties after removal of a total hip prosthesis. *J. Arthr.*, 1987, *2*, 37-41.
13. MAROTTE J. H., COHEN E., LORD G., BLANCHARD J. P., GUILLAMON J. L. Résultats comparées des résections et coaptations de hanche pour arthrite septique. À propos de 36 cas. *Rev. Chir. Orthop.*, 1982, *68*, 517-22.
14. OLDER J. Low-friction arthroplasty of the hip. A 10-12 year follow-up study. *Clin. Orthop.*, 1986, *211*, 36.
15. PETTY W., GOODSMITH S. Resection of arthroplasty following infected total hip arthroplasty. *J. Bone Joint Surg.*, 1980, *62-A*, 889-96.
16. SALVATI E. A., WILSON P. D., JOLLEY M. N., VAKILI F., AGLIETTI P., BROWN G. C. A ten year follow-up study of our first hundred consecutive Charnley total hip replacements. *J. Bone Joint Surg.*, 1981, *63-A*, 753-67.
17. SCHURMAN D. J., BLOCH P. A., SEGAL M. R., TANNER C. M. Conventional cemented total hip arthroplasty. *Clin. Orthop.*, 1989, *240*, 173-80.
18. SYBRANDY S. 25 Year hip prosthesis : retrospect, balance and future. *Ned. Tijdschr. Geneesk.*, 1985, *129*, 1721-25.
19. WEJKNER B., STENPORT J. Charnley total hip arthroplasty. A 10-14 year follow-up study. *Clin. Orthop.*, 1988, *231*, 113-19.

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