International Journal of Surgery Research
www.surgeryjournal.in
Online ISSN: 2664-6056, Print ISSN: 2664-6048
Received: 27-11-2021; Accepted: 13-12-2021; Published: 28-12-2021
Volume 3, Issue 2, 2021, Page No. 48-50

Evaluation of girdlestone operation as treatment option for avascular necrosis of femoral head

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Abstract
This is a prospective and retrospective study which was conducted in AL-Basrah General Hospital and Ibn- AL-Baitar Private Hospital from January 2009 to September 2010 (retrospectively we review cases in which Girdlestone procedure was conducted since 2002). Twelve adult patients (8 males and 4 females) were studied, their age range from 22-56 years, They suffered from severe avascular necrosis(AVN) of their hip joints (six of them bilateral and other six unilateral), all of them were with stage IV (according to Ficat and Arlet X- ray staging), and all of them were treated by Girdlestone resection arthroplasty. Pain relief achieved in 16 hips (88.9%) and in 16 hips (88.9%) there was good range of motion (ROM). Eight patients (66.6%) had good walking ability, while two patients (16.6%) were able to indoor walking with aids and the remaining two (16.6%) were chair bound. Overall eight patients (66.7%) expressed their satisfaction with the Girdlestone procedure, although the functional outcome seems to be quite less favourite. The main disadvantage was proximal migration of femur mostly between 4-8cm in 9 patients (74.9 %) which measure from x-ray whether unilateral or bilateral Girdlestone. infection pre-existed in two patients (one patient has infected dynamic hip screw and other patient has postoperative infection after core decompression surgery) both of them cured postoperatively. One patient converted to total hip arthroplasty after one year due to unstable gait. All the patients are followed over different periods of time, in six patients (50%) follow up over period less than 2 years and other six follow up range from 2-8 years. The Girdlestone operation appears as a viable solution to achieve pain relief and to control infection at the cost of limited mobility and function, in this specific subgroup of patients with severe AVN of femoral head.

Keywords: girdlestone, resection, arthroplasty

Introduction

Bones are living tissue, and like all living tissue they rely on blood vessels to bring blood to keep them alive. Most living tissues have blood vessels that come from many directions into the tissue. If one blood vessel is damaged it may not cause problems, since there may be a backup blood supply coming in from a different direction. But certain joints of the body have only a few blood vessels that bring in blood. One of these joints is the hip. This document will describe what happens when this blood supply is damaged and results in what is called avascular necrosis (AVN) of the hip [1]. Avascular necrosis is a disease resulting from the temporary or permanent loss of the blood supply to the bones. Without blood, the bone tissue dies and causes the bone to collapse. If the process involves the bones near a joint, it often leads to collapse of the joint surface. This disease also is known as osteonecrosis, aseptic necrosis, and ischemic bone necrosis [2]. Osteonecrosis of femoral head was first described in 1738 by Munro. In approximately 1835, Cruveilhier depicted femoral head morphologic changes secondary to interruption of blood flow. Since 1962, when Mankin described 27 cases of AVN, the number of reported cases has increased steadily [3].

Aim of the study

The aim of this study is to assess the functional outcome after Girdlestone resection arthroplasty performed for severe avascular necrosis (AVN) stage IV of femoral head whatever the causes of AVN.

Patients and Methods

This is a prospective and retrospective study which was conducted in Orthopaedic Department at AL-Basrah General Hospital and Ibn-AL-Baitar Private Hospital, from January 2009 to September 2010 (retrospectively we review cases in which Girdlestone procedure was conducted since 2002). Twelve patients (8 males and 4 females), age ranges from 22-56 years (mean age 40.9 years), with 18 hips, present with severe avascular necrosis of femoral head (stage IV) according to Ficat and Arlet x-ray staging system were studied. Six had bilateral hip involvement and in the remaining six the involvement was unilateral. A total of 18 hips treated operatively by Girdlestone resection arthroplasty (excision of head and neck of femur) were studied. All patients were evaluated by detailed history, thorough physical examination of hip (tenderness, stiffness, deformity, and range of motion), laboratory investigation and imaging studies that include x-ray and MRI (in some patients). We started with

stabilization of patients general condition, which included control of co-morbid medical illnesses. Pre-operative informative discussion were made with all patients about the technique and, it's functional outcome, possible complications and it's alternatives. We chose patients with severe AVN (by x-ray), which associated with one or more of the following:

a. Poor general condition (medical and socioeconomic).
b. Patient acceptance and willing to have the procedure although we discuss with him about the alternatives (i.e. He / She would not accept to put a device with the possibility of complications and revision)
c. Presence of infection or infected implant. All surgeries had been done under general anaesthesia, prophylactic antibiotic (ceftriaxone 1 g. i.v) at time of anaesthesia induction and was continued for 5-7 days postoperatively, except in 2 patients pre –existed by infection which treated by multiple debridement and triple antibiotics for 3 weeks. Two patients received one pint of blood preoperatively, 8 patients received 2 pints intraoperatively, 2patients received one pint of blood postoperatively. Anterolateral approach to the hip used in 15 hip operations (according to surgeon preference), lateral approach in one patient, posterior approach in one patient and anterior approach in one patient, with average time 45 mints for each hip, 6 patient has bilateral AVN surgery done in one session. Postoperatively skin traction used in 16 hips and skeletal traction in 2 hips (obese patients), with 4-5 kg weight for 4-6 weeks. The patients were discharged after 5-7days with their traction to be continued at home. Although the patients were kept on 6 weeks traction and on no antithrombotic drugs, we did not report deep vein thrombosis (DVT) or bed sores in any. In all patients, physiotherapy was started 6 weeks after operation inform of walking re-education and muscle strengthen exercise for 6 weeks. The patients were followed through 3 weeks visits. During follow up visits the patients were evaluated clinically for pain, sign of infection, shortening, unstable gait and radiologically to assess the proximal migration of femur.

Results

Twelve patients with severe AVN (stage IV) of femoral head were treated, The distribution of patients according to age group showed that most of AVN in our series presented between age of 30-50 years (about 66.6%) as shown in table 1

Table 1: distribution of patients according to age:

Age/years	Numbers	Percentage
20-30	1	8.3
30-40	5	41.6
40-50	3	25
>50	3	25
Total	12	100%

The operation was conducted on males more than females as shown in (table 2).

Table 2: distribution of patients according to sex:

sex	Number of patients	percentage
male	8	66.7
female	4	33.3

Table 3: distribution of patient according to presenting illness:

Presenting illness	numbers	percentage
Pain	12/12	100%
Decrease ROM*	12/12	100%
Limping	8/12	66.7 %
**Discharging sinus	2/12	16.7 %

*ROM. range of movement
**Discharging sinus: due to pre-existed infection.

Six patients (50%) have bilateral AVN (operation done in one session) and the remaining 6 (50%) were unilateral as show in table 4.

Table 4: distribution of patient according to side:

Side	numbers	percentage
Rt	4	33.3%
Lt	2	16.7%
Bilateral	6	50%
Total	12	100%

The possible contributing factors for AVN of femoral head are shown in the table-5.

Table 5: distribution of patients according to possible contributing factors:

Contributing factors	No. of patients
Smoker	6
Steroid	3
Alcohol	3
Sickle cell anaemia	5
Trauma*	3

*Trauma: 2 patients fall from height and 1 due to road traffic accident.

The standard surgical approach used in most of the patients was anterolateral (15 operations) represent 83.3% while other approaches used less frequently, as shown in table 6.

Table 6: distribution of patient according to surgical approaches:

Approaches	Anterior	Lateral	Anterolateral	posterior	medial	Total
numbers	1	1	15	1	0	18
Percentage	5.5%	5.5%	83.3%	5.5%	0%	100%

Most of proximal migration of femur between 4-8 cm (74.9%) detected after 3 months, as shown in table 7.

Table 7: distribution of patients according to distance of proximal migration

Proximal migration/ cm	Number of cases	Unilateral	bilateral	Percent
< 2cm	0	0	0	0
2-4 cm	3	3	0	25%
4-6 cm	5	2	3	41.6%
6-8 cm	4	1	3	33.3%
Total	12	6	6	100%

The comparison in patient outcome (pain, ROM and ability to walk), preoperatively and postoperatively, is shown in table 8.

Table 8: Patients outcome

complain	preoperative	postoperative	Percent
pain	18 hips	16 hips free of pain 2 hips still has pain	88.9 % 11.1 %
ROM	18 hips with gross limitation	16 hips good ROM 2 hips limited all hips movement	88.9 % 11.1 %
Ability to walk	3 patients wheelchair 9 walking aids	2 walk without aid 6walk with elbow crutches 2 in door walk(aids) 2 wheelchair	16.6% 50% 16.6% 16.6%

As a rating system and because of large and confusing number we consider that patient with following ROM: flexion> 90^0, extension> 20^0, abduction> 30^0 adduction >30^0, External & internal 20-30^0, As good ROM

Table 9: Patients satisfaction

patients	satisfied	unsatisfied	total
number	8	4	12
percent	66.7%	33.3%	100%

All the patients are followed-up over different periods of time, in six patients (50%) followed-up over a period less than 2 years, as shown in table-10:

Table 10: follow-up of patients in years:

Years	Number of patients	percentage
8-10	1	8.3%
6-8	0	0.0%
4-6	1	8.3%
2-4	4	33.3%
< 2	6	50.0%
Total	12	100%

Conclusions

- Girdlestone procedure may, still, have place as treatment option of some patients with AVN of femoral head especially to relieve pain, increase range of motion (ROM) and to control infection.
- The satisfaction rate was high despite a poor functional outcome.
- The limb length discrepancy, shortening, limping, limited walking distance and the permanent use of cane were the greatest disadvantages in our patients.
- It should be kept as last choice i.e. as salvage procedure rather than first treatment option, this is especially true for control of infection with AVN of femoral head.

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