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Rapidly Destructive Arthropathy Of The Hip: A Case Series Based On The Egyptian Community Arthroplasty Register

Mahmoud Alm Eldin Hafez[1], Omar Ahmed Farahat Rizq Khalifa[2], Rashed Emam Rashed[3], Kareem Abdel Kader[4]
[1]Professor of Orthopedic Surgery, Faculty of Medicine, October 6 University, Cairo, Egypt
[2]M.B.B. Ch, Faculty of Medicine, October 6 University, Cairo, Egypt
[3]Professor of Orthopedic Surgery, Faculty of Medicine, Al-Azhar University, Cairo, Egypt
[4]Lecturer of Orthopedic Surgery, Faculty of Medicine, October 6 University, Cairo, Egypt

Abstract
Purpose of study: *Rapidly destructive arthropathy (RDAH) of the hip is a poorly diagnosed condition. Its outcome is lacking in the literature, especially in developing countries. This study aims to evaluate the outcomes of Total Hip Replacement (THR) in RDAH in low-income settings, looking at survival, function and complications.*
Methods: *Review of the Egyptian Community Arthroplasty Register (ECAR) from 2007 to 2022, identified 15 hips with RDAH in 12 patients (3 bilateral). The mean age was 57 years old. Rapid progression of hip pain and disability was a consistent clinical feature, mean duration of symptoms was 6.25 months ranged from 2 to 12 month. All patients had undergone THR.,*
Results: *During the period of follow up (average 11.5 years), 80 % of patients had no complications, while one patient experienced dislocation, one patient with per- prosthetic fracture of greater trochanter and another had loosening requiring revision surgery. The Harris Hip Score significantly improved from 36.75 preoperatively to 77.33 postoperatively ($p<0.001$). All patients proved to be RDAH, as there was no evidence of other causes for rapid destruction such as Charcot, infection or cancer either preoperatively or at the end of follow up.*
Conclusion: *Although THR for RDAH is a complex procedure, the complication rate was nearly comparable to straight forward THR within literature. It appears that going for hip arthroplasty for RDAH without full investigation is an appropriate decision.*
Keywords: *Hip, rapidly destructive arthropathy, RDAH, total hip replacement*

1. INTRODUCTION

RDAH first described by Forestier in 1957 [1], is a poorly understood syndrome characterized by rapid joint deterioration and femoral head disappearance. It is defined radiographically as >50% joint space narrowing or >2 mm femoral head destruction within a year and often it is misdiagnosed as other hip pathologies [2], but it differs in its unilateral occurrence, rapid progression (6–12 months) [3], and typical onset in elderly females [4].

Multiple theories attempt to explain RDAH, including osteoclast activity, vascular alterations, metabolic factors, subchondral fractures, and crystal deposition, but no definitive cause has been established [5]. Histologically, RDAH resembles osteoarthritis or avascular necrosis but lacks osteophytes and exhibits more aggressive bone destruction [6]. Radiographic progression includes initial joint space narrowing, followed by extensive subchondral bone loss and complete femoral head disappearance [7].

RDAH leads to severe morbidity, and THR is the only treatment [8]. However, few research papers described outcome of THR and improved functionality after THR in literature in developed countries but as far as we know no one described THR outcomes in RDAH in low-income settings countries. Our aim is to evaluate the outcomes of THR in rapid destructive arthropathy of the hip in low-income settings looking at survival, function and complications with the exclusion of Charcot, infection or cancer as a cause for rapid destruction of hip joints.

2. MATERIALS AND METHODS:

Our study is observational retrospective follow up study of patients with RDAH recorded in the ECAR from 2007 to 2022. we revised ECAR and it showed 12 cases with 15 hips that had RDAH in the last 15 years, due to rarity of cases. We collected data retrospectively from ECAR and prospectively for follow up by interview (face to face in the outpatient clinic or virtual clinic),

Our inclusion criteria were all population presenting in elective setting with rapidly progressing hip pain and with radiographic evidence of joint destruction within a few months or weeks and diagnosed as RDAH, unilateral or bilateral disease and patients with RDAH who had total hip replacements.

Exclusion criteria were any patient with recent fracture of head and /or neck femur, avascular necrosis of the hip, tumor, infection, Charcot arthropathy or inflammatory arthropathy**.**

The study was conducted in accordance with the principles of the Declaration of Helsinki and was approved by the Institutional Review Board.

3. RESULTS:

This study group contains 7 males (58.3%) and 5 females (41.7%), age of patients was ranged from 24 to 86 years with mean 57.08 and standard deviation (SD) 16.66, 4 patients have left sided hip pain (33.3%) and 5 patients have right sided hip pain (41.7%) and 3 patients have bilateral Hip pain (25.0%), 83.3% had muscle wasting. In addition to shortening, there were 2 patients who had flexion and adduction deformities, duration of symptoms was ranging between 2 and 12 months with standard deviation 3.19, mean 6.25 months, 12 patients were taking non-steroidal anti-inflammatory drugs (NSAIDS) and one patient was taking corticosteroids as shown in table (1).

Regarding co-morbidities of our patients, 33.3% of patients had hypertension, 16.7% had cardiac issues and 8.3% had autoimmune disease, no history of Charcot or infection in studied patients, 3 patients had history of different fractures, 8.3% had history of old acetabulum fracture, 8.3% had bilateral neck of femur fracture, and 8.3% had history of old pelvic fissure as shown in table (2)

The mean true leg length discrepancy was 2.5 cm, with a frequency of 0.5 cm (8.3%), 2.0 cm (16.7%), 3.0 cm (25.0%), and 4.0 cm (8.3%). The mean apparent leg length discrepancy was 3.6 cm, with a frequency of 3.0 cm (25.0%), 4.0 cm (8.3%), and 5.0 cm (8.3%). There were hips with dramatic destruction over a period of 6 months and post-operative THR was done as illustrated in Figures 1,2,3,4)

Table (1): Sociodemographic characters and co morbidities of patients (SD =standard deviation)

Co morbidities	N (15 hips in 12 patients)	%
Age [mean (Sd) min: max}	57.08 (16.66) 24: 86	
sex	7 males:5 females	58.3:41.7
Diabetes	1	8.3
Hypertension	4	33.3
Cardiac	2	16.7
Hepatic	0	0.0
Renal	0	0.0
Autoimmune disease (RA)	1	8.3
NSAID intake Corticosteroids intake	12 1	100 8.3
Affected side: Right side Left side Bilateral	 4 5 3	 333.3 41.7 25.0

Duration of symptoms in months [mean (Sd) min: max]	6.25 (3.19) 2.0:12.0

12 months	1	8.3 %
2months	1	8.3 %
3 months	2	16.7%
4 months	1	8.3 %
5 months	3	25.0 %
6 months	3	25.0 %
9 months	1	8.3 %

Table (2): Previous history and symptoms:

Symptoms and its duration	Counts	% of Total
Lower back pain	4	33.3
History of Recent Fractures History of old fractures acetabulum fracture 19 years before presentation bilateral neck of femur fracture 25 before presentation pelvic fissure	0 3 1 1 1	0 25% 8.3 8.3 8.3
Infection	0	0.0
Previous tumor (cured lymphoma), no metastasis no effect on bone and joints	1	8.3
History of Charcot	0	0.0
Wasting of muscles	10	83.3
Inflammation	1	8.3
Scars	2	16.7
Pain	12	100
Shortening	12	100
Stiffness	12	100
Deformities:	12	100

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Radiological Assessment of RDAH patients

Figure (1)
a - Severe destruction of femoral heads, necks and acetabula

b- The post-operative x-ray is showing uncemented large head ceramic in both hips

Figure (2) Significant destruction of left femoral head and acetabulum

Figure (3) Significant destruction of left femoral head in less than 5 months of male patient 59 years old, first x-ray was done on 17/10/2022 and second x-ray was done on 5/3/2023

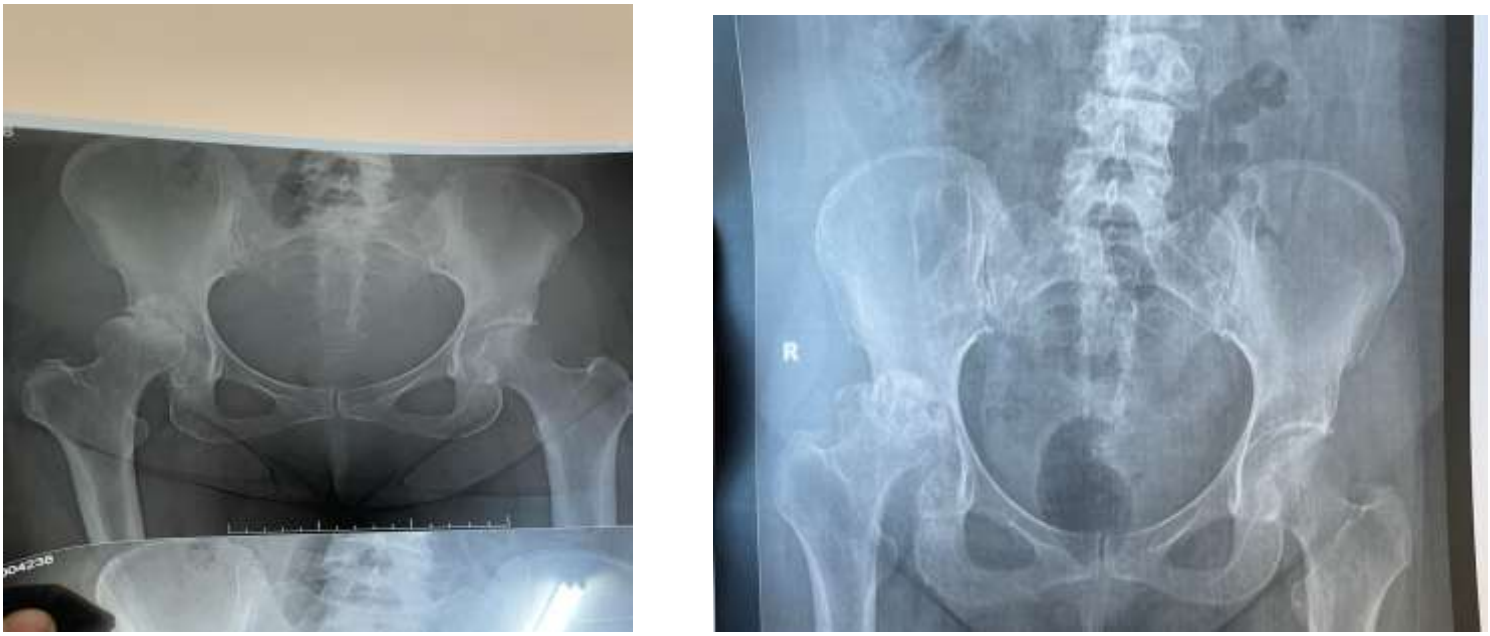

Figure (4) Significant destruction of right femoral head in less than 2 months of female patient 69 years old, first x-ray was done on April 2023 and second x-ray was done on November 2023

Follow-up of patients with mean duration 11.5 years reveal majority (80 %) of patients had no complications, while one patient (6.7 %) experienced dislocation due to fall, one patient with Peri-prosthetic fracture of

greater trochanter (6.7 %) and another had loosening (6.7 %) and need revision surgery but he died from liver failure before surgery. The Harris Hip Score significantly improved postoperatively ($p<0.001$).as shown in table (3) also none of the patients developed clinical, radiographic, or laboratory evidence of infection during the follow-up period (mean 11.5 years). No late infections were diagnosed or revised for infection, further supporting the exclusion of occult infection.

Table (3): Comparing Harris Hip score before and after operation:

	Mean	N	Std. Deviation	Std. Error Mean
Harris Hip Score Before Operation	36.75	15	15.1725	4.3799
Harris Hip Score After Operation	77.33	15	8.0941	2.3366

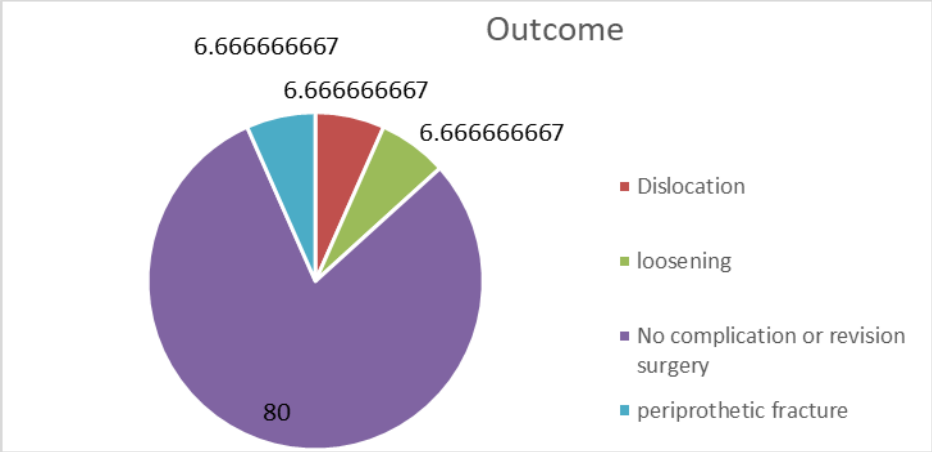

Fig (5) outcome of surgery

4. DISCUSSION:

RDAH of the hip is a rare condition characterized by rapid joint degeneration and destruction similar to findings of infection, osteonecrosis, or Charcot disease, but without a definitive diagnosis. The cause and natural history of RDAH are unclear, but total hip arthroplasty has been utilized as a treatment modality. [9]

Yamamoto and Bullough [10] showed that subchondral insufficiency fractures of the femoral head occur in elderly women with osteopenia, and they proposed that insufficiency fractures resulting from osteopenia might lead to the rapid collapse of the hip joint. However, Richette et al. could not demonstrate a role for systemic low bone mass in patients with RDAH. Komiya et al [11] detected elevated interleukin (Il-1beta) and metalloproteinase levels in the joint fluid but the precise pathogenesis of rapidly destructive hip osteoarthritis remains unclear.

Review of the ECAR from 2007 to 2022, yield 15 hips with RDAH in 12 patients 3 patients are bilateral). Patients in our case series had no history of Charcot or infection or cancer. Mean duration of symptoms in months was 6.25 SD 3.19 ranged from 2 to 12 month. All patients underwent THR, with a mean follow-up of 11.5 years.

Regarding demographics, the mean age was 57.08 with SD 16.66, aged from 24 to 86 years old, which was lower than reported by others Yuasa, T. et al. [12] (72.3) with SD 8.18 and Hu, L. et al [2] (69.02), and Batra S et al. [13] (68.8).

Regarding gender distribution, our study has 12 patients: 7 males and 5 females, with 3 patients having bilateral hips (58.8% male and 41.15% female), with a slight male predominance. Yuasa, T. et al. (2016) [12] reported a female predominance with a 12:0 male-to-female ratio, and Batra S [13] et al. reported a gender distribution of 16 female patients (89%) and 2 male patients (11%).

Regarding side distribution, our case series comprised 12 patients, with four patients being right-sided, five patients left-sided, and three patients bilateral, which correlates with the rarity of bilateralism as reported by Hu, L. et al. [2], who noted that in a review of 181 reported cases, only three were bilateral.

Regarding comorbidities, our patients had hypertension (33.3%), cardiac disease (16.6%), Rheumatoid arthritis (8.3%), and these findings correlate with literature reports, such as by Hu, L. et al. [2], who found cases with hyperlipidemia, coronary heart disease, diabetes mellitus, occlusive arterial disease, rheumatoid arthritis, and hypertension.

Regarding the history of taking NSAIDs, all 12 patients in our case series were taking NSAIDs, and one patient had a history of taking corticosteroids.

Regarding previous history and symptoms' duration, our case series revealed that 4 patients had a history of trauma, with no patients having a history of Charcot or infection. The mean duration of symptoms in months in our patients was 6.25 (SD 3.19), ranging from 2 to 12 months, whereas Yuasa, T. et al. (12) reported a mean of 9 months (range, 4-11), and Batra S et al. [13] reported a longer duration of symptoms, ranging from 6 months to 3 years (mean, 1.4 years).

All patients complained of hip pain and limitation of movements (100%), 8.3% had muscle wasting, and 100% had limb length discrepancy of various degrees. Two patients had deformities, including flexion and adduction deformities. These findings are consistent with the literature, such as Hu, L. et al. [2], in their systematic review, where all patients had hip pain and limitation of movements.

Harris Hip Score was improved from 36.75 preoperatively to 77.33 postoperatively, with a statistically significant improvement ($p<0.001$), which is consistent with the literature, such as Yuasa, T. et al. [12]. After a mean follow-up of 9.3 years, the mean Harris Hip Score improved from 38.3 to 81.1 in RDAH patients and from 43.6 to 84.2 in controls ($p=0.13$). Yuasa, T. et al. [12] also reported that one patient had dislocation but did not require revision surgery, while Peters KS et al. [1] reported that the Harris Hip Score improved from 25.8 (SD 7.3, range 11–34) preoperatively to 88.3 (SD 9.7, range 71–98) at the latest follow-up and reported no signs of prosthetic loosening or migration.

Study Limitations includes the rarity of RDAH and scarce knowledge about disease leads to limited the sample size

5. CONCLUSION:

Although THR for RDAH is a complex procedure, the complication rate was nearly comparable to straight forward THR within literature. It appears that going for hip arthroplasty for RDAH without full investigation is an appropriate decision.

Statements and Declarations

Funding: *The authors declare that no funds, grants, or other support were received during the preparation of this manuscript*

Ethics approval

This study was performed in line with the principles of the Declaration of Helsinki. Approval was granted by the Ethics Committee of October 6 University (Date 27/11/2023 /No PMC-Me-2311009).

Consent to participate

Not applicable

Consent to publish

Not applicable.

Conflict of Interest

No potential conflict of interest relevant to this article was reported.

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