Benha Journal of Applied Sciences (BJAS) **print: ISSN 2356–9751**
Vol. (6) Issue (4) Part (2) (2021), (261-265) **online: ISSN 2356–976x**
http://bjas.journals.ekb.eg

Migratory Transient Osteoporosis of the Hip Joint during Pregnancy

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Abstract

Background & Objective: Transient hip osteoporosis is uncommon but is believed to be undiagnosed and underestimated in frequency. This research is a systematic review to summarise the information available about transitory migrating hip joint osteoporosis during pregnancy. Methods: A complete computerised search for papers published in the database of PubMed using the following keywords: "migratory osteoporosis during pregnancy," "transient hip osteoporosis during pregnancy" Results and findings: This disease has no recognised aetiology and pathophysiology, and mostly affects middle-aged men and women in the final quarter of pregnancy. MRI is the best way to diagnose TOH and to rule out oh hip pain in other situations. On T1-weighted images with high signal intensity, MRI shows the homogeneous pattern of marrow edoema with intermediate signal sequences. TOH is an autonomous condition which is resolved progressively within 6–8 months. No procedure is required for this disease and treatment includes basically a symptomatic relief and protected weight bearing till osteoporosis improves, and it is important that TOH be differentiated from avascular necrosis of hip on MRI to avoid surgery with needles. Medical treatments (including teriparatide, biphosphonates, calcitonin, vitamin D) may decrease the duration of symptoms on the basis of reports in the literature. Core decompression in TOH alone is no better than medical treatment. Further research and randomised clinical trials are necessary to compare different ways of therapy.

Keywords: Migratory, Osteoporosis, Hip, Joint, Pregnancy.

1. Introduction

The transient osteoporosis (TO) is a rare condition characterized by joint pain, localized radiographic osteopenia and bone marrow edema (BME) on magnetic resonance imaging (MRI) as an isolated findings without apparent cause.[١]

The etiology and pathology of this condition are unknown, and it mostly affects middle-aged males and females in the third trimester of pregnancy.[2]

TO represents a disorder that may be monoarticular usually in the hip joint or “migratory” with involvement of two or more joints in the lower limb, affected in succession over a number of months. It occurs most commonly in the hip, then in the knee, ankle and foot .[3, 4]

The condition was first described by Curtiss and Kincaid in 1959; as they reported 3 cases of transient demineralization of the hip joint who presented with hip pain, all were pregnant in the third trimester. The condition was later termed transient osteoporosis of the hip (TOH) by Lequesne .[1, 5]

TOH has been reported under different names in the literature, i.e. transitory demineralization, transient migratory osteoporosis, regional migratory osteoporosis, bone marrow edema syndrome (BMES).[6, 7, 8]

MRI is the most useful method to diagnose TOH, demonstrating homogenous pattern of marrow edema, as low signal intensity on T1-weighted imaging, high intensity on T2-weighted and STIR sequences, Additionally, T2-weighted imaging may reveal hip joint effusion, the edema usually located at the femoral head and may extend to femoral neck and intertrochanteric region. TOH is a self-limiting condition that gradually resolves within 6–8 months. No intervention is needed for this condition, and management essentially involves symptomatic relief, protected weight bearing until the osteoporosis resolves, differentiating TOH from avascular necrosis (AVN) of the hip on MRI is crucial to prevent needless surgical intervention.[9, 10]

Some case reports have shown faster improvement and shorter recovery time with bisphosphonates and calcitonin. Core decompression also has been done to relieve pain and shorten the recovery time however it is not better than medical treatment; it seems aggressive and unnecessary for a self-limiting disease.[6, 11, 12]

This study aimed to conduct a systematic review to provide a summary of the available literature regarding transient migratory osteoporosis of the hip joint during pregnancy

2. Patients and methods

A comprehensive electronic search in PubMed data base for articles published using these keywords: "migratory osteoporosis during pregnancy", "transient osteoporosis of the hip during pregnancy" and "bone marrow edema syndrome during pregnancy".

Revision of all titles, abstracts and the full text of articles that were potentially eligible based on abstract review, then trials selected according to the following inclusion and exclusion criteria.

2.1. Inclusion criteria

- Randomized control trials studies, Retrospective studies, case series studies.
- In vivo studies.
- Adult patients
- Pregnant female patients
- Published in English language
- Hip joint involvement

2.2. Exclusion criteria

- Animal or cadaveric studies.
- Male patients

2.3. The data extracted included the following items

- Study characteristic; name of the first author, country, year of publication and study design.
- Participant's characteristic; number of patients, mean age and parity
- Disease characteristic: onset, duration, involved side and complications
- Diagnostic tools and treatment
- Follow up

3. Results

From electronic searching, a total of 110 studies were identified. Based on titles and abstracts 59 irrelevant studies were removed. Full texts of 51 studies were reviewed, 23 of them were excluded because either hip joint not involved, review articles, not human studies, male patients. Finally 28 studies were included in the systematic review.

Mean age of the patient, gestational age at onset of symptoms and duration of the disease, table 1, mean duration of the disease, figure 1,2, mode of delivery in figure 3.

Table (1) mean age of the patient, gestational age at onset of symptoms (weeks) and duration of the disease (weeks).

	Minimum	Mean	Maximum	Standard Deviation
Age	23	33	46	5
Gestational Age at onset of symptoms (weeks)	16	30	38	5
Duration of the disease (weeks)	4	18	48	11

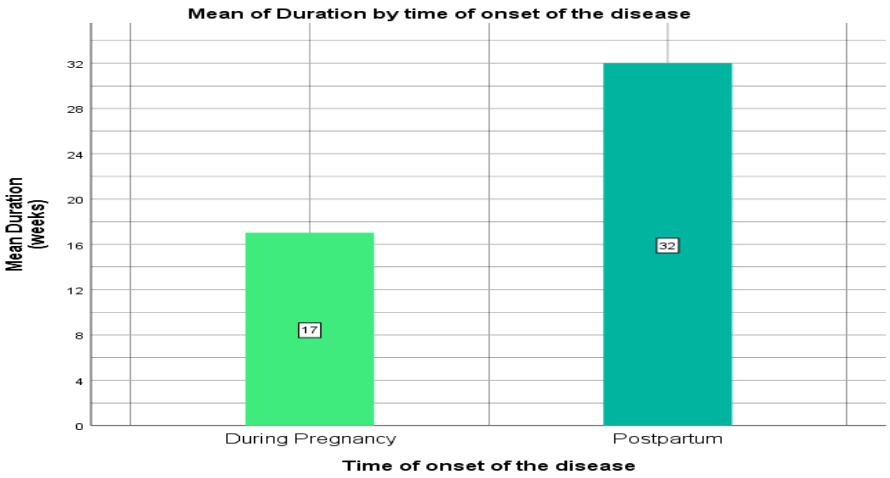

Fig. (1) mean duration of the disease (weeks) by time of onset of the disease (during pregnancy or postpartum).

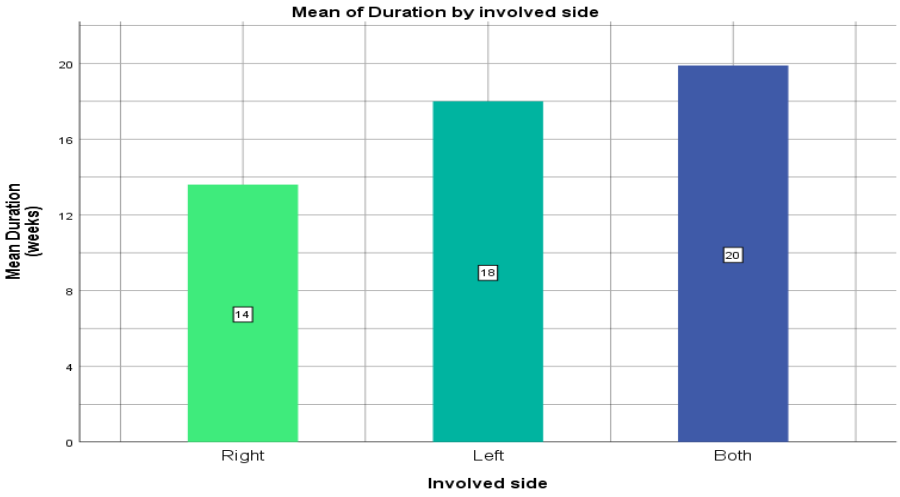

Fig. (2) Mean duration of the disease (weeks) by involved side.

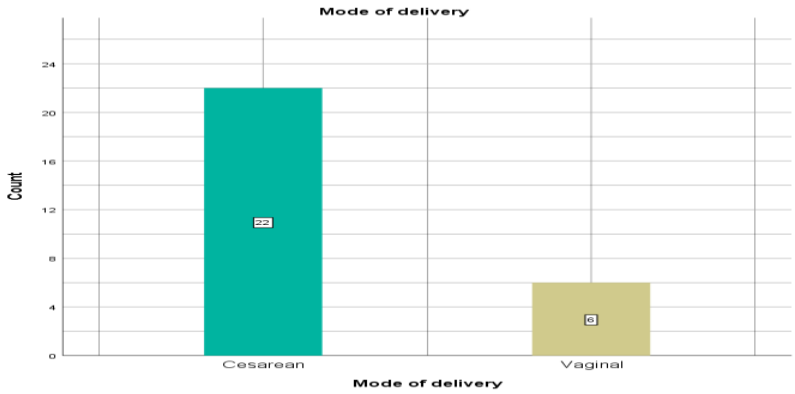

Fig. (3) count of cases according to mode of delivery.

Diagnostic tools used in included studies are shown in table 2. treatment methods used in included studies are shown in table 3.

Table (2) diagnostic tools used in included studies.

Diagnostic tools	Count
MRI	31
CT	3
X-ray	35
Dexa	11
Bone Scan	5
Biopsy	1
Ultrasound	2

Table (3) count of treatment methods used in included studies.

Treatment	Count
Bisphosphonates	6
Analgesic	13
Heparin	3
Estrogen	1
Calcium	11
Vitamin-D	9
Calcitonin	5
Iloprost	١
Surgical treatment (core decompression)	1
Teriparatide	1

Cases complicated with fracture neck of femur, figure 4. mode of delivery and fracture neck femur crosstabulation in table (4)

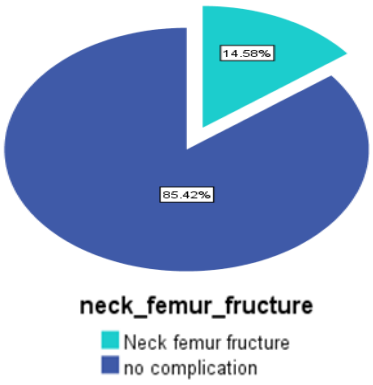

Fig. (4) pie chart of percentage of cases complicated with fracture neck of femur

Table (4) mode of delivery and fracture neck femur crosstabulation.

		Neck femur fracture	no complication	Total
labor	**C-Section**	3	19	22
	Vaginal	4	2	6
Total		7	21	28

5. Discussion

In our research bisphosphonates were used in 6 instances to treat TOH, 5 cases with calcitonin, 9 cases with vitamin D, 11 cases with calcium, Teriparatides, 1 case with iloprost and 3 cases with heparin.

However, the significance of the different treatment methods to recovery acceleration is disputed. No comparison studies evaluate various effectiveness, recovery time and problems treatment approaches.

Further studies were also necessary during pregnancy and breastfeeding to evaluate the safety of bisphosphonates and calcitonin.

Core decompression has also been done in order to alleviate discomfort and shorten the recovery period, but it is not better than medical therapy.

In our research, most of the cases of TOH therapy with core decompression have been considered conservatively, Truszczynska[13] stated, which decreases increased endosteal pressure and a bone marrow edoema but the pathophysiology and effectiveness of the mechanism is yet to be shown.

Specific hazards may be linked with core decompression; fractures reported in the literature. In addition, problems related with cartilage injury, infection, bleeding and anaesthesia were reported. Most authors thus favour cautious therapy rather than core decompression. [5]

Additional research and randomised clinical trials are necessary to identify the optimal way to both relieve pain and enhance bone health to minimise risk of problems.

TOH may impact parity, birth style and breast-feeding. Due to the severity of the illness and the lengthy convalescence, individuals with TOH may forgo future pregnancies. Due to the significant chance of recurrence, many women choose to stop family planning at an early stage.

Most mothers with TOH have been recommended to wean for calcium conservation or to be treated with special analgesics, Regarding the method of birth, TOH patients underwent a primary (planed) cessarean due to restrictive mobility and hip discomfort more frequently. [14].

In addition, there is no agreement on the best delivery method, although CS is intended to safeguard against birth-related damage. [14].

The path of work and delivery is generally dictated by obstetric requirements. However, the cessarean delivery is considered the most protective for individuals diagnosed with TOH in order to avoid potential birth-related injuries.

This is because it is multifactorial. During vaginal birth, patients are frequently located in severe hip flexion, external rotation and abduction positions of the dorsal lithotomical system, such that patients may have vaginal supply difficulties due to uni- or bilateral abduction limitations of thigh flexion. Regional anaesthetic also eliminates the limiting impact of hip pain and may raise the risk of fracture. [15]

The conversation about delivery positions for TOH patients should include the patient, obstetrician, orthopaedic surgeon and physical treatment practitioner.

Lastly, patient-specific physical therapy is highly recommended for gait training, pelvic stabilisation and ergonomics before to and after delivery.

In our review 6 vaginal cases have been delivered, four of them are complicated with femoral neck fracture. Twenty-two patients underwent the C-section, three of which were complicated with femur.

Some patients are identified with TOH after vaginal administration is compounded by femoral fracture.

6. Conclusion

Transient osteoporosis is an uncommon illness, and a clinical issue which should be taken into account with hip or groin discomfort in pregnant women. This disease has no recognised aetiology and pathophysiology, and mostly affects middle-aged men and women in the final quarter of pregnancy. MRI is the best way to diagnose TOH and to rule out oh hip pain in other situations. On T1-weighted images with high signal intensity, MRI shows the homogeneous pattern of marrow edema with intermediate signal sequences. TOH is an autonomous condition which is resolved progressively within 6–8 months. No procedure is required for this disease and treatment includes basically a symptomatic relief and protected weight bearing till osteoporosis improves, and it is important that TOH be differentiated from avascular necrosis of hip on MRI to avoid surgery with needles. Medical treatments (including teriparatide, biphosphonates, calcitonin, vitamin D) may decrease the duration of symptoms on the basis of reports in the literature. Core decompression in TOH alone is no better than medical treatment. Further research and randomised clinical trials are necessary to compare different ways of therapy.

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