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A case of pathological fracture caused by vitamin D insufficiency in a young athlete and a review of the literature

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ABSTRACT

Our patient is a 16-year-old boy basketballer with no significant medical history or previous injuries. He fell on his right hip during jogging and sustained a right superior-posterior hip dislocation with a Pipkin type 2 fracture of the femoral head. Manipulation and reduction under sedation then general anaesthesia was unsuccessful he underwent open reduction and internal fixation.

Because his fall was of low energy, an endocrinologist was consulted to rule out primary contributing factors to his fracture dislocation. He was found to have insufficient levels of vitamin D (22.4 μg/l) which was replaced subsequently. Other hormonal investigations were unremarkable. The Bone Mineral Density of his left femoral neck measured 1.098, corresponding to a Z-score of 1.1 (normal). At 2 months post operation, our patient was pain free and able to ambulate without aid. Follow up Xrays showed satisfactory alignment with no evidence of osteonecrosis.

We conducted a literature search on pubmed with keywords: Hip, dislocation, fracture, minimal trauma, atraumatic, vitamin D deficiency. We then excluded post-operative dislocations and found 4 articles reporting minimal or atraumatic hip dislocations.

Posterior hip dislocations have been reported in literature to be a high energy trauma, usually due to an axial load on the femur, typically with hip flexed and adducted. Complex posterior fracture-dislocation of the native hip joint in adults is usually caused by road traffic accidents or falls from heights.

Native hip dislocations in adults associated with minimal or no trauma are rarely reported in literature, and are mostly due to hip dysplasia, arthritis, connective tissue disorders or spastic muscular paralysis. Of note there are no reports of vitamin D deficiency causing a hip fracture dislocation.

This is the first known case of an athlete sustaining a vitamin D insufficiency fracture. In patients presenting with posterior hip dislocations after minimal or no trauma, underlying causes must be excluded. More research is necessary to investigate the relationship between vitamin D insufficiency and hip dislocations.

1. Introduction

Posterior hip dislocations have been reported in literature to be a high energy trauma, usually due to an axial load on the femur, typically with hip flexed and adducted. Complex posterior fracture-dislocation of the native hip joint in adults is usually caused by road traffic accidents or falls from heights.[1] Our patient presented with Pipkins type 2 femoral head fracture dislocation[2] after minimal trauma, and was found to have vitamin D insufficiency.

2. Case report

Our patient is a 16-year-old boy basketballer with no significant medical history or previous injuries. He was jogging when he tripped and fell onto his right hip, and was subsequently unable to ambulate thereafter due to ipsilateral hip pain. X-rays showed a right superior-posterior hip dislocation with a Pipkin type 2 fracture of the femoral head (Fig. 1). There was no suggestion of hip dysplasia on the contralateral hip. CT scan confirmed the posteromedial fracture of the right femoral head, and excluded acetabular fractures (Figs. 2 and 3).

Manipulation and reduction under sedation then general anaesthesia was unsuccessful and decision was made to do open

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Fig. 1. Right superoposterior hip dislocation with Pipkins 2 femoral head fracture.

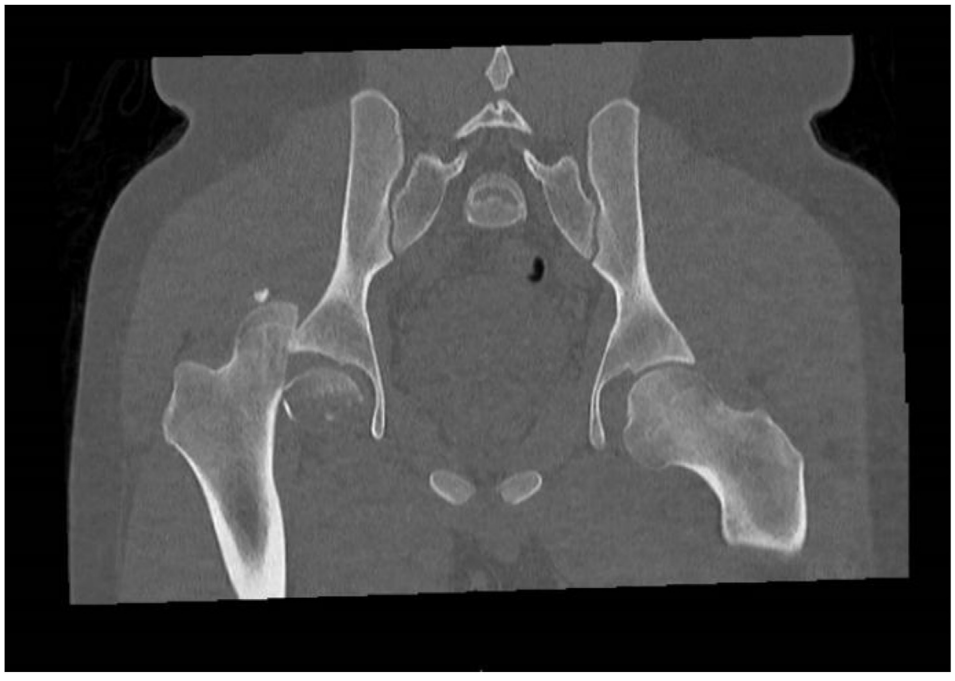

Fig. 2. CT pelvis (coronal view).

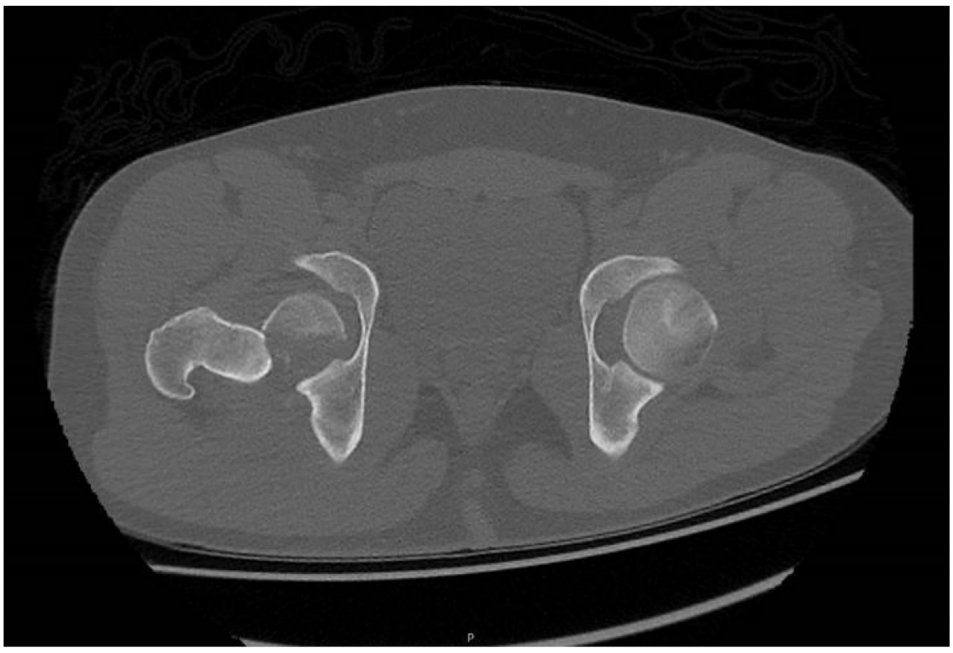

Fig. 3. CT pelvis Axial view.

reduction and internal fixation. A lateral approach (Hardinge) was taken and the femur fragment was removed. The hip was then dislocated anteriorly for the reduction of the intrafoveal fragment and 3×3.0mm headless compression screw and 1×4.0mm cancellous screw was used for the femoral head fixation. Because his fall was of low energy, an endocrinologist was consulted to rule out primary contributing factors to his fracture dislocation. He was found to have insufficient levels of vitamin D (22.4 μg/l) which was replaced subsequently. Other hormonal investigations such as testosterone, calcium, parathyroid, thyroid and creatinine levels were unremarkable. The Bone Mineral Density of his left femoral neck measured 1.098, corresponding to a Z-score of 1.1 (normal). At 2 months post operation, our patient was pain free and able to ambulate without aid. Follow up Xrays showed satisfactory alignment with no evidence of osteonecrosis (Figs. 4 and 5).

3. Discussion

This is the first known case of an athlete sustaining a vitamin D insufficiency fracture. We conducted a literature search on pubmed with keywords: Hip, dislocation, fracture, minimal trauma, atraumatic, vitamin D deficiency. We then excluded post-operative dislocations and found four articles reporting minimal or atraumatic hip dislocations.

Native hip dislocations in adults associated with minimal or no trauma are rarely reported in literature, and are mostly due to hip dysplasia, arthritis, connective tissue disorders or spastic muscular paralysis. Of note there are no reports of vitamin D deficiency causing a hip fracture dislocation.

A historical paper published by R. Watson Jones in 1926 before motor vehicles and high rise buildings became the normal reported that spontaneous dislocations were far greater in frequency compared to traumatic dislocations.[3] The cases included dislocations from upper motor neuron and lower motor neuron paralytic lesions and various causes of joint destruction from arthritis to haemophilia.

Kohan reported a case of atraumatic hip dislocation in a 61 year old lady with rheumatoid arthritis, most likely contributed by a shallow acetabulum and erosive joint disease with pannus formation.[4] Fisher described a case of a 54 year old woman with bilateral recurrent hip dislocations after sequential cardinal dislocations from 2 falls from standing height spaced 2 years apart.[5] Xrays showed a normal left hip but widened acetabulo-femoral joint space. CT scan showed a subluxated right hip with erosions of the femoral head. Open reduction with capsular plication was performed and patient was placed on abduction pillow, however she re-dislocated on 3rd post-operative day. Patient declined total hip arthroplasty and remained wheelchair bound. Hughes reported a 6-year-old boy with neurofibrosis who presented with hip dislocation after being caught in a dog leash and subsequently falling.[6] Closed reduction under anaesthesia was successful and x-rays were normal 1.5 years after the incident.

We suggest that underlying causes must be excluded in patients presenting with posterior hip dislocations after minimal or no trauma. This may include exclusion of infection or underlying hormonal or metabolic deficiencies, a full neurological workup and CT scan of the hip to assess the structural integrity of the joint. More research is necessary to investigate the relationship between vitamin D insufficiency and hip dislocations.

Conflicts of interest

This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

Fig. 4. Post-operative XR hip (AP).

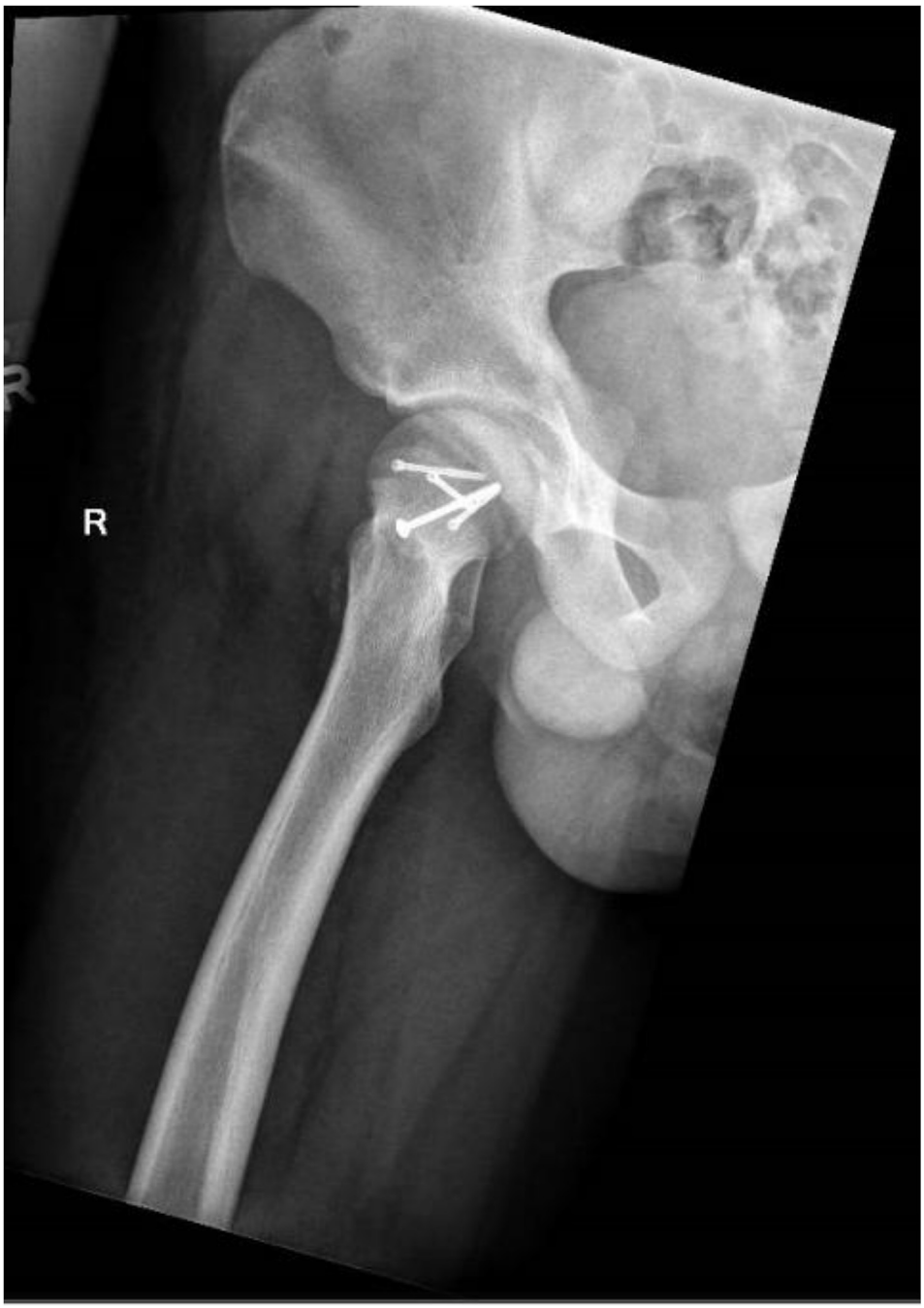

Fig. 5. Post-operative XR hip (lateral).

Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.jcot.2019.03.016.

References

1. Dawson-Amoah K, Raszewski J, Duplantier N, Waddell BS. Dislocation of the hip: A review of types, causes, and treatment. *Ochsner J.* 2018;18(3):242–252. https://doi.org/10.31486/toj.17.0079.
2. Romeo NM, Firoozabadi R. Classifications in brief: the pipkin classification of femoral head fractures. *Clin Orthop Relat Res.* 2018 May;476(5):1114–1119. https://doi.org/10.1007/s11999.0000000000000045.
3. Jones RW. Spontaneous dislocation of the hip. *Br J Surg.* July 1926;14(53). https://doi.org/10.1002/bjs.1800145304.
4. Kohan KJ, Thomas MA. Acute atraumatic hip dislocation in an adult with rheumatoid arthritis. *Am J Phys Med Rehabil.* 2012 Apr;91(4):346–348. https://doi.org/10.1097/PHM.0b013e318238a249.
5. Fischer JW, Todd B, Sanville P, Webb M, Mirza AH. Bilateral recurrent atraumatic dislocation of the hip joints–a case report. *Acta Orthop Scand.* 2003 Feb;74(1):104–106. https://doi.org/10.1080/00016470310013761.
6. Hughes MJ, D'Agostino J. Posterior hip dislocation in a five-year-old boy: A case report, review of the literature, and current recommendations. *J Emerg Med.* 1996 Sep-Oct;14(5):585–590.