E-ISSN: 2707-8353
P-ISSN: 2707-8345
IJCRO 2023; 5(1): 95-98
www.orthocasereports.com
Received: 18-01-2023
Accepted: 26-02-2023

Dr. Joana Almeida
University Hospital São, João, Porto, Portugal

André Pinho
1. São João University Hospital Center, Porto, Portugal
2. Faculty of Medicine of the University of Porto, Portugal
3. Research Center for Health Technologies and Services, Porto, Portugal

Maria João Almeida
1. Ph.D., São João University Hospital Center, Porto, Portugal
2. Ph.D., Faculty of Medicine of the University of Porto, Portugal

Nuno Telo Ramos
São João University Hospital Center, Porto, Portugal

João Duarte Silva
1. São João University Hospital Center, Porto, Portugal
2. Faculty of Medicine of the University of Porto, Portugal

Vitorino Veludo
1. São João University Hospital Center, Porto, Portugal
2. Faculty of Medicine of the University of Porto, Portugal

António Sousa
1. Ph.D., São João University Hospital Center, Porto, Portugal
2. Faculty of Medicine of the University of Porto, Portugal

Corresponding Author:
Dr. Joana Almeida
University Hospital São, João, Porto, Portugal

Avulsion of the gluteus maximus associated with a Morell Lavellè lesion in a pelvic ring fracture

Dr. Joana Almeida, André Pinho, Maria João Almeida, Nuno Telo Ramos, João Duarte Silva, Vitorino Veludo and António Sousa

DOI: https://doi.org/10.22271/27078345.2023.v5.i1b.151

Abstract
Morell Lavellè injury is associated with high-energy trauma. By itself, avulsion of the gluteus maximus is an extremely rare injury, and their association is extremely rare.
Case report: A 21-year-old was victim of a car accident. On admission, he presented pelvic instability and a large hematoma in the right gluteal region. X-rays and computerized axial tomography (CT) were performed. He was diagnosed with a bilateral sacral wing fracture with dislocation of the left sacroiliac joint and underwent fixation of the sacroiliac joint with cannulated screws on the left. After discharge, he recurred due to fever with inflammatory signs on the posterior surface of the right buttock, with palpation of a gap. Faced with this situation, a CT scan was repeated where an extensive degloving lesion of the soft parts was identified, opting for debridement and surgical cleaning. During the surgery, detachment of the gluteus maximus from its ileal insertion was verified. After adequate mobilization and release, transosseous reinsertion was performed with a multifilament suture. To date, no incidents to report, with good clinical and imaging evolution.
Discussion: The gluteus maximus is one of the external rotators and the most important extensor of the hip, playing a preponderant role in gait. In addition, it has functions as a global stabilizer of the pelvic ring. Diagnose is not easy, it might even go unnoticed. Form of repair is not consensual: we performed a transosseous reinsertion with Ethibond® and Vicryl®.
With this case we intend to highlight the importance of soft tissue degloving injuries in the context of polytraumatized patients.

Keywords: Gluteus maximus, avulsion, polytraumatized, morell lavalle, pelvic ring fracture, ungloving lesions

Introduction
Pathophysiology of Morell Lavellè lesion is related to traumatic detachment of the subcutaneous cellular tissue of the muscle fascia and generally is associated with high-energy trauma [1]. By itself, avulsion of the gluteus maximus is an extremely rare injury, with only one other similar case report of Maryland [2], according to our knowledge. Thus, the association between these two conditions is even rarer, which is why we report the following case.

Case report
A 21-year-old was admitted in our emergency room after being victim of a high-kinetic road accident. Upon admission, he was conscious, cooperative, hemodynamically stable. Objectively, he had signs of pelvic instability. There was no major deformity of any long bone and no signs of bony exposure or discontinuity solutions, except for a blunt wound in the right paravertebral region of about 1 cm communicating with a large hematoma in the right lumbar/gluteal region. For thar reason afterwards a drain was put. In concordance with our trauma institution's trauma, he underwent radiographs and computed tomography (CT) of the spine and pelvis, which revealed a bilateral sacral wing fracture with dislocation of the left sacroiliac joint (Lateral Compression type III, classification Young-Burgess) (fig. 1). We decided for urgent surgical treatment with fixation of the left sacroiliac joint with 6.5 mm partially threaded cannulated screws (Stryker®) in S1 and S2, after closed reduction with support from a portal in the anterior inferior iliac spine and skeletal traction to the left femoral condyles; in deferred, osteosynthesis of the humerus was performed with an anterograde locked nail (Synthes®). Immediate postoperative period was uneventful.

He performed a CT scan to assess hematoma dimensions, which decreased considerably being the drain withdrawn. Eventually, the patient was discharged. After 3 days, he returned with fever associated with a fluctuating swelling on the posterior surface of the right lumbar region. Objectively, an evident gap was palpable, distally to the iliac crest. Towards that, we decided to request a CT scan, which objectify at an extensive degloving lesion of the soft tissues associated to a rupture of the gluteus maximus (fig. 2). Taking this account, surgical intervention was performed, with debridement and surgical cleaning. During surgery, proximal detachment of the gluteus maximus from the posterior gluteal line of the ilium and its roughest area, which included part of the insertion into the iliac crest, was found (fig. 3). After adequate mobilization and release, transosseous tendinous reinsertion was performed with non-absorbable multifilament suture (Ethibond®), reinforced end to end in the thoracolumbar fascia with another absorbable multifilament suture (Vicryl ®). Subsequently, extensive debridement was performed with cleaning with about 9 liters of saline solution, with the placement of two drainage systems. Samples of soft tissues and liquid were collected, which were later sent for analysis, with identification of a multiresistant *Bacillus cereus* and *S. epidermidis*. Initially, he was empirically medicated with flucloxacillin; at the time of the complete antibiogram, vancomycin was added. Due to persistent infratherapeutic levels, linezolid was introduced, which was maintained for a total period of 6 weeks. During the postoperative period, he remained apyretic and wound healing progressed favorably, without the need of further intervention.

The patient completed full discharge for a period of 12 weeks, complemented with rehabilitation from the 4th week with passive and active mobility. From the 3rd month, he integrated an intensive rehabilitation program, that included restoring lumbopelvic stability, improvement of balance, weight-bearing and non-weight bearing exercises, development of muscular strength and endurance of gluteal muscles groups as well as exercises to optimize neuromuscular performance. Currently, he goes frequently to the gym in order to improve consistently his muscle strength.

At one year follow-up, he has residual pain complaints, being able to walk without limping and without the need for external support. He has no sensory or motor deficits. Objectively, he has a little asymmetry between his buttocks with complete range of motion of the hip. A magnetic resonance imaging (MRI) was performed (fig. 4), which showed consolidation of previously documented fractures, improvement in edema of the muscles of the paravertebral gutter and gluteus medius, as well as cicatricial and fibrotic changes, especially in the most superior portion of the iliac insertion of the gluteus maximus.

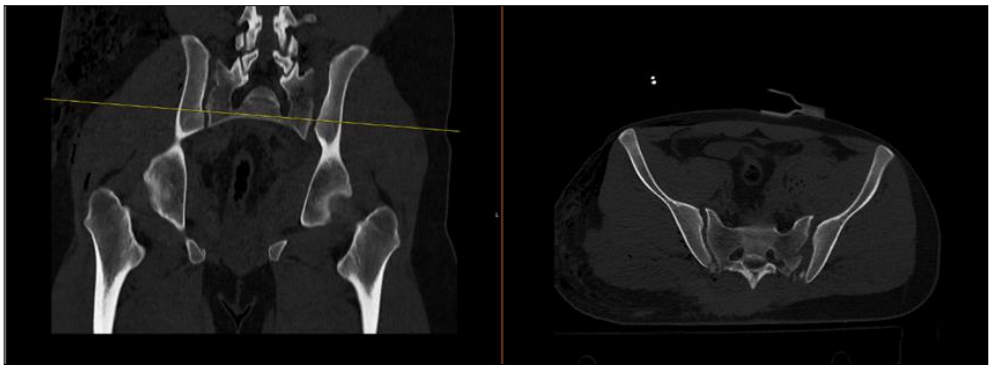

Fig 1: CT scan (coronal and axial planes) on admission, showing a Lateral Compression type III

Fig 2: Axial CT scan showing Morell Lavèlle lesion

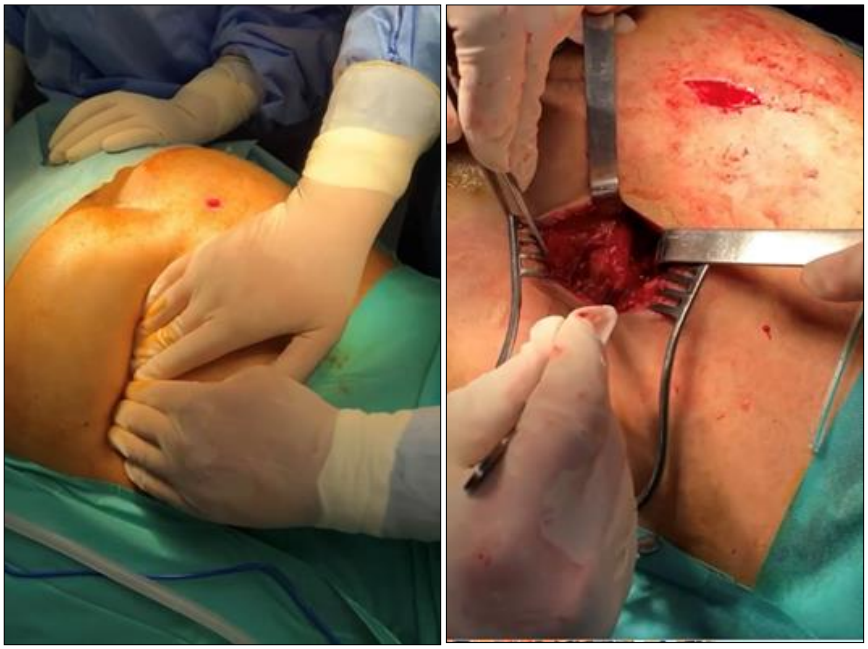

Fig 3: Intraoperative imagens: the gap from the gluteus maximus at the bottom

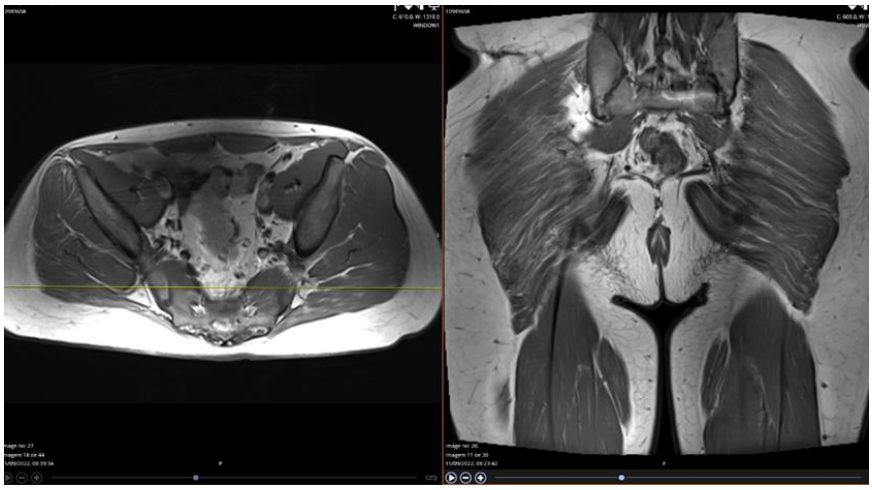

Fig 4: MRI T1 sequence (axial and coronal planes) showing scaring of maximus gluteus

Discussion

Currently, there is still no consensus on the algorithm to approach Morell Lavallé lesion, however the available literature allows us to follow some key guidelines, based essentially in size lesion and cronicity [1, 3]. There is a role for conservative management of this lesions, with the use of compression bandaging, and it is reserved from small acute lesion without capsule in the knee [3, 4]. Another option is percutaneous aspiration, but it is linked to higher probability of recurrence[5]. When this fails, sclerodesis with doxiciclin is an option for considerably small lesions, between 400 to 700 mL, and can be used in chronic lesion as well[6]. Open drainage and debridement is often reserved for big and recurrent lesions. In this case, the decision to intervene surgically was related to lesion size and suspicion of superinfection [7].

Concomitantly, we considered repair of the gluteus maximus avulsion preponderant for the final clinical result. This muscle it is the biggest and strongest of the human body [8], having multiple sites of insertion: lateroposterior surface of the sacrum and coccyx, gluteal surface of the ilium, which is posterior to the posterior gluteal line, thoracolumbar fascia, gluteal and erector spinae aponeurosis, and even the sacrotuberous ligaments [9]. It is a powerful external rotator and the most important extensor of the hip; it was its evolutionary development that allowed us the capacity of bipodal support and upright posture [10]. In addition, it has functions as a stabilizer of the lower lumbar spine, through interactions with the erector spinae muscle and thoracolumbar fascia, sacroiliac joint, lumbosacral zone, femoral head in the acetabulum, and also an eventual role in stabilizing the knee in extension due to its relationship with the iliotibial band. It plays as well as preponderant part in the normal gait pattern. Being this said, it is easy to understand the need to address this lesion, as its diagnosis is not easy and may even go unnoticed. In this specific case, the therapeutic solution involved surgical intervention. However, this injury is difficult to treat because it involved muscle suture and repair muscular tissue to bone is a problem. The best tecidular repair is not consensual [11], being meshes, patches or transosseous suture an option. We performed a transosseous reinsertion with Ethibond®, reinforced with end-to-end Vicryl®. Characteristically, these multifilaments have a high tensile strength and reduced tissue reaction, which allows a more uniform distribution of tension, thus reducing the probability of

failure[2]. Furthermore, it mitigates the risk of infection. As far as we know, there are still no biomechanical studies investigating which is the best way to repair musculotendinous repairs.

The management of this case raise questions about the way we treat our polytraumatized soft tissue injuries. This is, it was the open procedure that leads to the diagnosis of this rare injury which may leads us to think how many cases went unnoticed. Towards this we should conjecture whether to assess this patient by imaging studies, such MRI or CT, or direct approach with surgical debridement and exploration.

Morell Lavellè injuries in polytraumatized patients are frequent, and their diagnosis and treatment must be timely. With this unique case, we intend to raise awareness of the existence of associated injuries in pelvic ring fractures[12] and reinforce the importance of proper management of soft tissue injuries - muscle avulsion and degloving - which are often not as valued as osteoligamentous injuries of the pelvis.

Acknowledgement
Not available

Author's Contribution
Not available

Conflict of Interest
Not available

Financial Support
Not available

References

1. Greenhill D, Haydel C and Rehman S. Management of the Morel-Lavallée Lesion. Orthop Clin North Am. 2016;47(1):115-125. 2015/11/29. Doi: 10.1016/j.ocl.2015.08.012.
2. Gwinn DE, Morgan RA, Kumar AR. Gluteus maximus avulsion and closed degloving lesion associated with a thoracolumbar burst fracture. A case report. J Bone Joint Surg Am. 2007;89(2):408-412. 2007/02/03. DOI: 10.2106/jbjs.F.00706.
3. Singh R, Rymer B, Youssef B, *et al*. The Morel-Lavallée lesion and its management: A review of the literature. J Orthop. 2018;15(4):917-921. 2018/09/08. DOI: 10.1016/j.jor.2018.08.032.
4. Shen C, Peng JP, Chen XD. Efficacy of treatment in peri-pelvic Morel-Lavallee lesion: a systematic review of the literature. Arch Orthop Trauma Surg 2013;133:635-640. 2013/02/28. DOI: 10.1007/s00402-013-1703-z.
5. Bansal A, Bhatia N, Singh A, *et al*. Doxycycline sclerodesis as a treatment option for persistent Morel-Lavallée lesions. Injury. 2013;44(1):66-69. 2011/12/30. DOI: 10.1016/j.injury.2011.11.024.
6. Molina BJ, Ghazoul EN and Janis JE. Practical Review of the Comprehensive Management of Morel-Lavallée Lesions. Plast Reconstr Surg Glob Open 2021;9(10):e3850. 2021/10/15. DOI: 10.1097/gox.0000000000003850.
7. Buckthorpe M, Stride M, Villa FD. Assessing And Treating Gluteus Maximus Weakness - A CLINICAL Commentary. Int J Sports Phys Ther. 2019;14(4):655-669. 2019/08/24.
8. Gray H, Carter. Gray's anatomy. 2022: Chapter 80, 1357.
9. Mayberry JC, Mullins RJ, Crass RA, *et al*. Prevention of abdominal compartment syndrome by absorbable mesh prosthesis closure. Arch Surg. 1997;132(9):957-961; discussion 961-952. 1997/09/25. DOI: 10.1001/archsurg.1997.01430330023003.
10. Beckmann NM, Cai C. CT incidence of Morel-Lavallee lesions in patients with pelvic fractures: a 4-year experience at a level 1 trauma center. Emerg Radiol. 2016;23:615-621. 2016/08/17. DOI: 10.1007/s10140-016-1430-1.

How to Cite This Article
Almeida J, Pinho A, Almeida MJ, Ramos NT, Silva JD, Veludo V, Sousa A. Avulsion of the gluteus maximus associated with a Morell Lavellè lesion in a pelvic ring fracture. International Journal of Case Reports in Orthopaedics. 2023; 5(1):95-98.