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Two Cases of Left Hip Heterotopic Ossification Treated with Surgery and their Outcomes Postoperatively

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Abstract: 52-year-old woman was admitted to Trauma and Orthopedics department (TOD) due to septic arthritis (SA) in left hip joint (LHJ). Patient underwent three consecutive open debridement procedures. During the treatment, an intracerebral hematoma was discovered. Upon rehabilitation patient indicated severe pain in LHJ that impaired movement. Three months after admission CT showed heterotopic ossification (HO) in LHJ. Patient was recommended to complete treating postinfectious complications and refer to TOD for further evaluation and discussing treatment options. Five months after the first presentation, complete mechanical block could be seen in LHJ due to HO. Open left hip ossificate resection and LHJ redressation were performed. During procedure significant increase in range of motion (ROM) was obtained. Iatrogenic transection of the femoral nerve occurred and was treated surgically. After surgery, patient was subjected to early rehabilitation and later forwarded to rehabilitation department. Increase of active and passive ROM remained. 34-year-old man was admitted to TOD due to polytrauma, including multiple hip and acetabular fractures. Patient underwent three surgical interventions due to fractures. Month after admission, postoperative deep tissue infection in the fracture and Covid-19 were discovered and treated. Two years later, patient returned to TOD complaining about significant impairment of ROM in LHJ due to HO, which was surgically removed. Surgical treatment is rarely chosen for treatment of HO since alleviation of pain is not worth the risks, and HO can reoccur, preferring treatment with exercise and indomethacin, but when a significant increase of ROM is expected, surgical treatment is justified. These case reports show how surgical treatment of HO with mixed origin in patients with good expected outcomes and high involvement in their own rehabilitation should be at least considered. It is important to emphasize both pre and postoperative rehabilitation and prophylaxis.

Keywords: Heterotopic ossification, Myositis ossificans, Postinfectious osteoarthritis, Mechanical block, Range of motion, Septic arthritis

Background

Heterotopic ossification (HO) is a frequent complication in rehabilitation settings that consists of the formation of mature, lamellar bone in the extraskeletal soft tissue. The suggested classification proposes division in three types – traumatic, *myositis ossificans progressiva* and neurogenic HO. It most often develops after joint

arthroplasty, burns, stroke, or spinal cord injury. The most common locations for HO development are areas highly susceptible to trauma, such as knee, elbow, hip and shoulder joints. (Mavrogenis et al., 2011). A rare pediatric form of HO is *myositis ossificans progressiva*, a rare metabolic disease where the muscle ossifies. About 10-20% of patients with traumatic brain injury develop HO; however, the prevalence has been reported from 0,2% to 4% after thermal injury and up to 30% after certain types of hip arthroplasty or acetabular fractures. *(*Zhu et al., 2015) Factors impacting the development of HO are the mechanism of injury, duration of immobilization and degree of spasticity. Moreso pressure ulcers, long bone fractures and edema have also been noted as factors increasing the risk of development of HO. (Ranganathan et al., 2015; Weppner et al., 2012) Newer research has also found correlation in HO in patients after hip arthroplasty with African American race, osteoporosis and low estrogen states (Singh et al., 2022).

There are no guidelines for definitive treatment of HO; however prophylaxis and perioperative use of non-steroidal anti inflammatory drugs (NSAIDs) have shown beneficial outcomes. The mechanism proposed is that by inhibiting the osteogenic progenitor cells from differentiating into bone progenitor cells, it can help reduce the risk of development of HO. *(Ranganathan et Al. 2015)* Since risk factors include immobilization and spasticity, passive and active development of movement in the affected joint is suggested. In most cases prophylaxis can prevent or alleviate the symptoms associated with HO, the most severe of them being pronounced reduction of range of motion (ROM), pain, nerve compression and ankylosis of the affected joint (Sun & Hanyu-Deutmeyer, 2022).

Surgical treatment is indicated in cases when the patient has decreased functionality due to the ossificates, the pain cannot be alleviated or there are signs of vascular or neural compression (Denomandie et al., 2018). The available data suggest different approaches for the surgery. While some research suggests waiting 12-18 months before the ossificate has completely matured depending on the etiology, other researchers encourage to perform early surgical intervention to minimize the risk of developing an intra-articular pathology, osteoporosis and ankylosis. Different surgical approaches have been described in various sources, depending on the localization of the ossificates. (Genet et al., 2009; Ranganathan et al., 2015; Yoon et al., 2018). Radiation therapy is also suggested for prophylaxis postoperatively to decrease the risk of re-development of HO (Lee et al., 2022).

Case Reports

Mixed Origin Heterotopic Ossification of the Left Hip

A 52-year-old woman was admitted to the Emergency Department at Riga East Clinical University Hospital "Gaiļezers" after generalized seizure with disturbed consciousness. According to anamnesis, the patient was abusing alcohol for a long period of time. Upon further evaluation the patient described pain in left hip and knee joints with decrease in ROM. Based on the patient's allegations, there was no previous pain or decreased ROM in upper mentioned joints.

Evidence of inflammation was found within the blood draw and LHJ aspirate. Patient was hospitalized in Riga East Clinical University Hospital Toxicology and Sepsis clinic. Upon arrival, the patient's condition was severe, requiring mechanical ventilation and treatment in the intensive care unit. A *Staphylococcus Aureus* sepsis was discovered the same day and due to multi organ dysfunction syndrome with renal failure the patient underwent hemodialysis.

Upon admission patient had Blood alcohol level 0,2 g/L, Leukocytes 7,42 10^9/L, Neutrophils 6,85 10^9/L, Erythrocytes 3,24 10^12/L, Hemoglobin 10,50 g/dL, Hematocrite 30,9%, Thrombocytes 81 10^9/L INR 0,88 Fibrinogen 0,52 g/L, CRP 231,7, ALAT 81, ASAT 377, Potassium 3,14 mmol/l, Procalcitonin 8,12 ng/mL, and Creatinine kinase 3408 U/L.

The urine sample showed positive Nitrite test, Protein 3 g/L, Erythrocytes 200 Ery/mkL, cloudy appearance, Albumin 150 mg/L, Albumin/Creatinine ratio 33,9 mg/mmol and Protein/Creatinine ratio 170 mg/mmol. Urine was positive for *Candida sp.* 100 000 CFU/mL.

The X-ray showed signs of an osteoarthritis (Figures 1&2) while the CT showed fluid collection in the LHJ between *m. obturatorius externus* and *m. pectineus* (3,5 x 5,6 x 3,1 cm) (Figures 3&4), LHJ III-degree degenerative osteoarthritis with synovitis, subcortical cysts and marginal osteophytes and liver steatosis. The CT of thoracic cavity and head was without any major changes.

Bronchioalveolar fluid was positive for *Staphylococcus aureus* < 1000 CFU/mL.

Figure 1. LHJ degenerative osteoarthritis, X-ray AP projection.

Figure 2. LHJ degenerative osteoarthritis, X-ray Lauenstein projection.

Figure 3. Fluid collection in LHJ area, CT with intravenous contrast coronal plane.

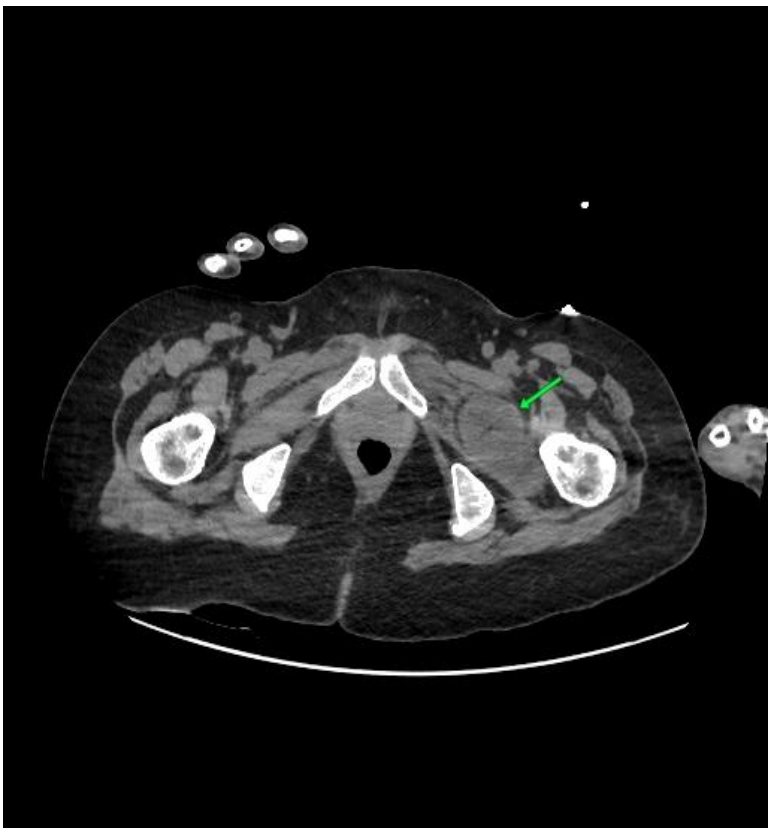

Figure 4. Fluid collection in LHJ area. CT axial plane.

The patient started antibacterial treatment with Ciprofloxacin 400 mg intravenously twice a day. On the second day, Ampicillin 2 g six times a day intravenously was added. Due to hypotension, the patient received continuous perfusion of inoconstrictors. On the third day, ciprofloxacin was switched to ceftriaxone 2 g two times a day based on hospital internal policy for treatment of infection without confirmed causative microorganism. On day six, the patient started treatment with oxacillin 2 g 6 times a day and continued it for the duration of the stay in the hospital. Three days after the initial admission an MRI was performed on the patient to evaluate possible infectious locus in the spine. In these scans an abscess could be seen clearly (Figure 5).

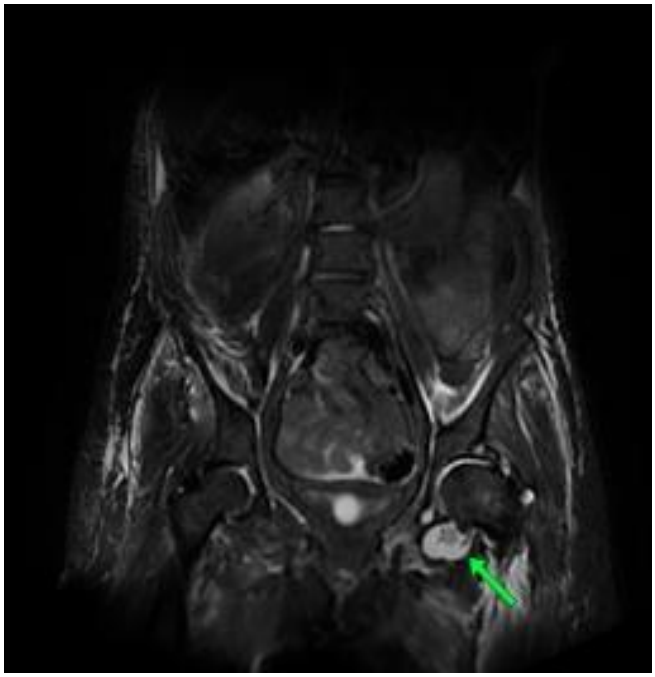

Figure 5. Intraarticular abscess, MRI coronal plane..

Four days after admission, a left hip arthrocentesis was performed, and opaque purulent fluid was obtained with a little amount of cells and no other significant changes. It was sent for microbial evaluation and was positive for *Staphylococcus Aureus* <1000 CFU/mL in two out of three samples. Since the patient was unfit for surgery, in the ICU in a mini open way a drain was inserted through hip adductors to ensure the drainage of pus from the affected joint until the patient was stable enough for surgical treatment.

A week after initial admission, multi resistant *Enterococcus sp.* 10 000 CFU/mL, Alpha-hemolytic *Streptococcus viridans* 10 000 CFU/mL and multi-resistant *Staphylococcus lugdunensis* 100 000 CFU/mL were found in the bronchoalveolar fluid. The lung X-ray showed worsening of the condition in comparison to the first one with left lung atelectasis. Since the patient underwent endotracheal intubation with subsequent mechanical lung ventilation, it is most likely that the patient acquired ventilator associated pneumonia.

Leukocytosis had escalated to 11,14 10^9/L with predominant neutrophilia (9,56 10^12/L). Hemoglobin 8,50 g/dL, Thrombocytes had elevated to 107 10^9/L after the patient received thrombocyte mass infusions. CRP had lessened to 155,9 mg/L, Albumin had lessened to 21,5 g/L, Potassium 3,17 mmol/L, Procalcitonin 2,35 ng/mL, Interleukin-6 had grown from 119,3 to 693,4 pg/mL in two days. Based on laboratory and clinical findings, patient had an active infectious process.

A week after the day of admission, the patient underwent open left hip debridement procedure with irrigation and drainage through an iliofemoral approach. During the debridement, purulent content was found in the joint. The sample taken came back negative, possibly due to antibacterial treatment already started. Eight days after admission and the first day after the debridement the patient underwent tracheostomy and continued to receive mechanical ventilation. On the CT, a pneumonia of both lungs could be seen with pulmonary hypertension and congestion in the small circulation circle. The abdominal CT scan showed multiple spleen ischemia areas, ascites, cyst in the left kidney. Fluid collections around left *m. gluteus medius* and *m. iliopsoas* could be found however the initial abscess between *m. obturatorius externus* and *m. pectineus* had lessened in size.

The histological evaluation of tissue samples taken from the arthritis site showed villous chronic synovitis, however, no microorganisms were found. The patient had multiple possible origins of the arthritis, however, none of the microbial samples matched.

Due to left hip pyogenic arthritis, the patient underwent three surgical interventions in two weeks after being stationed. The first surgical intervention was an arthrotomy and drainage, and an irrigation and draining a week after the first with the resection of *m. iliopsoas* due to necrosis of the muscle. The third intervention was another irrigation and draining in combination with antibacterial treatment after two more weeks. The last procedure included femoral head denervation due to hip arthritis with arthrosis. After the second procedure no microorganisms were found in any of the seven tissue samples sent for microbiological evaluation. An arthrocentesis of the left knee also showed no signs of microbial colonization. The patient continued treatment with Vancomycin and Oxacillin due to many other infectious complications such as central venous catheter infection, ventilation associated pneumonia and urinary tract infection.

Five weeks after the patient was admitted, an intracerebral hematoma in the right parietal lobe with signs of lysis was found un an MRI scan (Figure 6). A neurosurgeon consultant was invited and saw no indications for operative treatment.

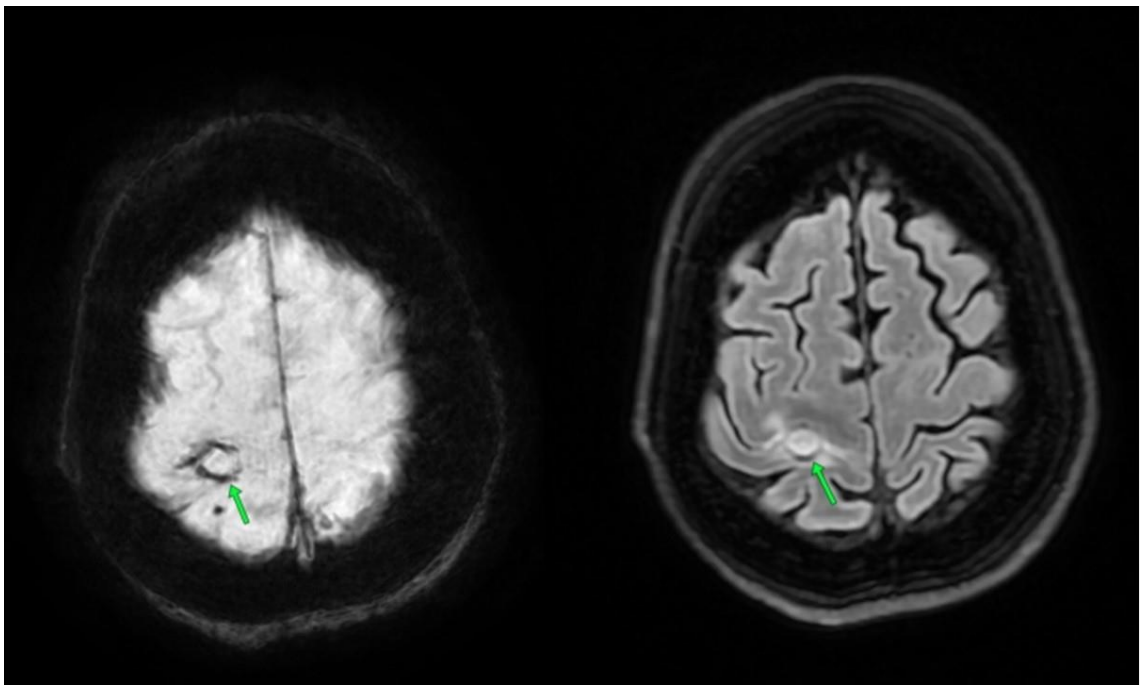

Figure 6. Right parietal lobe ICH, MRI SWI, T2 Flair, axial plane.

An echocardiogram was performed where a bacterial endocarditis of mitral valve and stage IV mitral regurgitation was found with the primary source being the left hip arthritis. The previous echocardiogram performed upon admission a month earlier showed no signs of bacterial endocarditis. A blood sample at the time showed Leukocytosis 11,17 10^9/L, CRP 59,70 mg/L, LDH 379,00 U/L, Procalcitonin 0,10 ng/mL, however, the patient had been receiving intravenous antibacterial treatment for a month. Due to intracerebral hematoma, surgical intervention was postponed after repeated consultations of neurologist and cardiac surgeon in three more weeks.

Seven weeks after the initial admission patient is stabilized, extubated and no longer undergoes hemodialysis. Both laboratory and imaging findings show leftover signs of an infection, however, the main site of the infection, the LHJ arthritis is treated with no signs of arthritis remaining. The patient was prepared for discharge to continue rehabilitation and undergo mitral valve replacement surgery at Pauls Stradins Clinical University Hospital. Afterwards the patient was transferred to Riga East clinical university hospital branch "Biķernieki" Rehabilitation clinic, where the patient undergoes rehabilitation. Two and a half months after initial arrival in ED, a CT for hip joint was performed. Osteodestructive lesions due to progression of the previously confirmed osteoarthritis in the LHJ are found (Figure 7). Around the left hip joint and in the upper part of soft tissue in the left thigh multiple ossificates and small surrounded fluid collections are seen (Figures 8 & 9).

Figure 7. Osteodestructive lesions of hip joint, CT coronal plane.

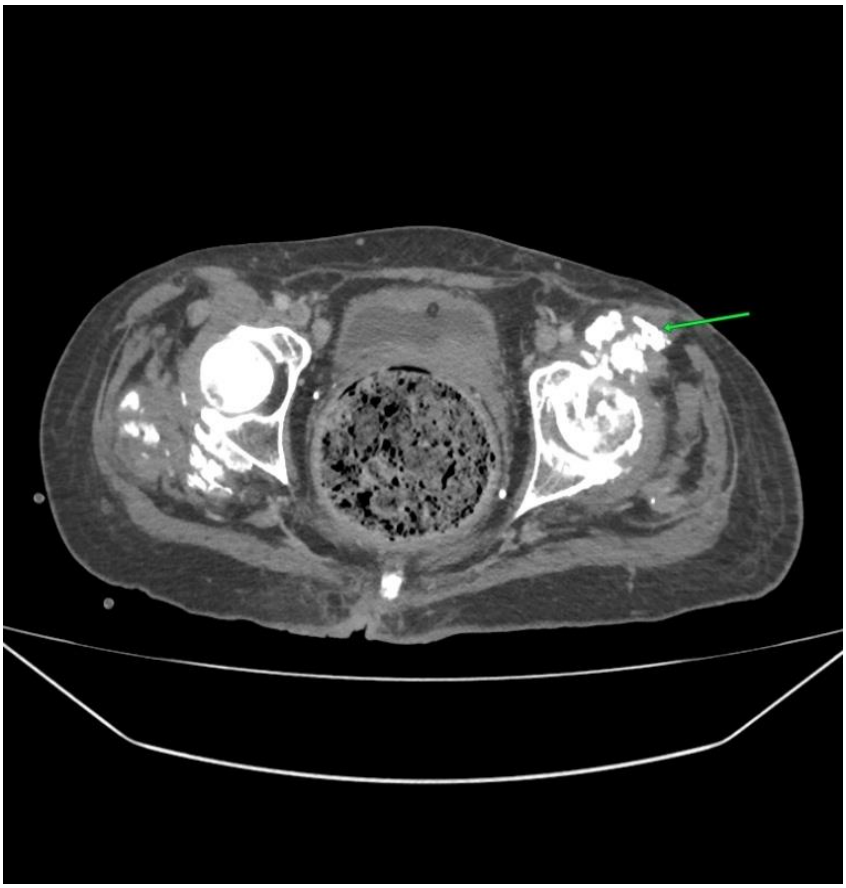

Figure 8. Ossificates around LHJ, CT axial plane.

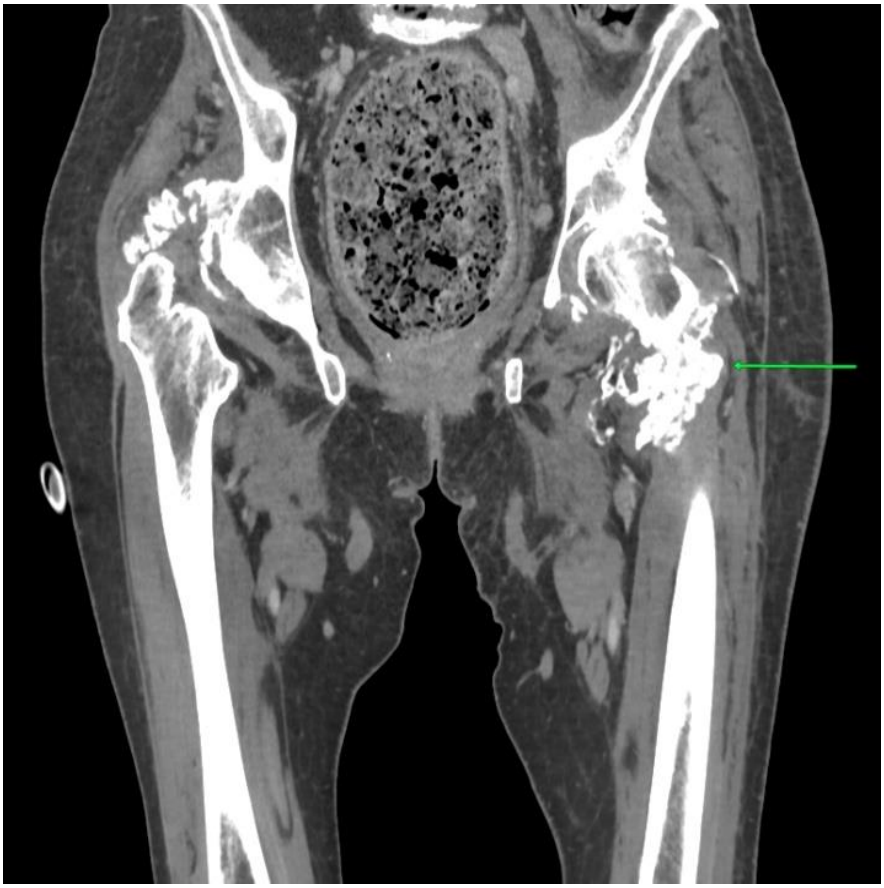

Figure 9. Ossificates around LHJ, CT coronal plane.

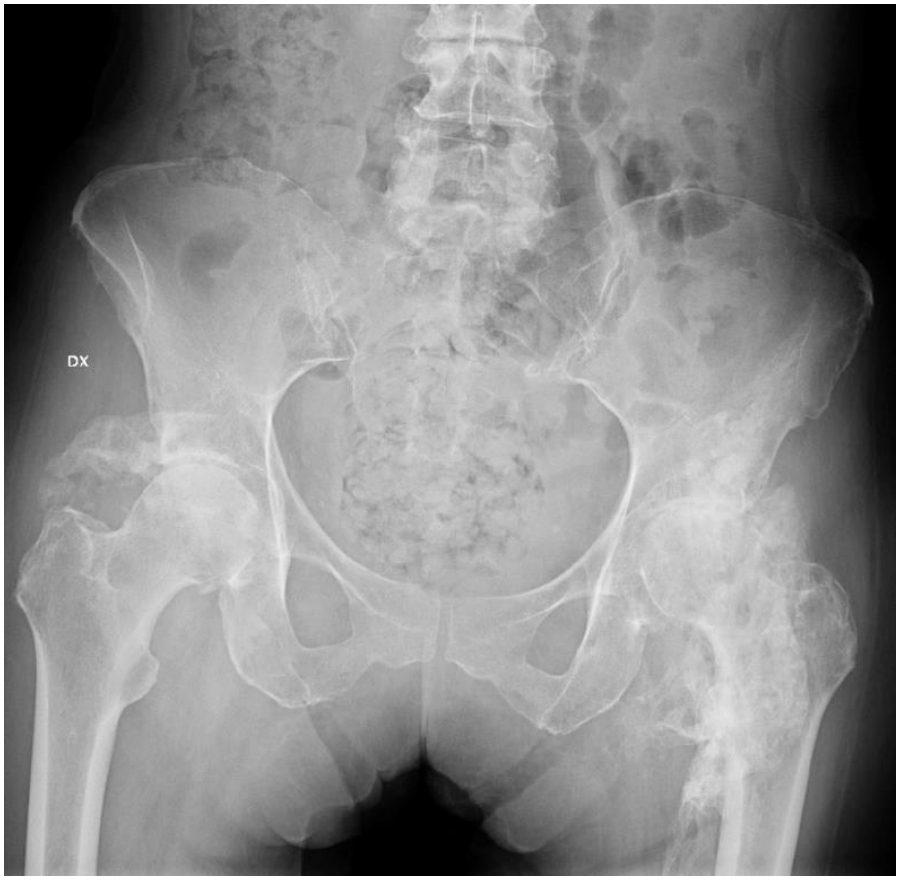

Figure 10. Left hip joint heterotopic ossification, X-ray AP projection.

Three months after the initial presentation, patient was transferred to Pauls Stradins Clinical University Hospital for treatment of mitral valve bacterial endocarditis with grade IV insufficiency and multiple vegetations with a diameter up to 1 cm. During and after the admission for the valve replacement surgery that was performed successfully, the patient continues to take peroral antibacterial treatment with Cefazolin for at least two more weeks after discharge. Two weeks after being transferred, the patient returned to the Rehabilitation clinic and continued to undergo rehabilitation in two stages. An increase in functioning was seen, however, LHJ was with severely decreased ROM, with a limited movement - flexion of 15 degrees. In the left knee ROM had improved with flexion possible up to 90 degrees. In five and a half months after the initial admission, an X-ray is done and massive HO can be seen (Figure 10).

Nine months after the initial hospitalization, patient returns to TOD to undergo removal of left hip HO. The stage of the ossification is Brooker III. (Hu et al.,2015). Upon arrival patient complains about significant restriction of movement in LHJ – extension zero degrees, flexion 20 degrees, passive and active abduction, adduction, inner and outer rotation are not possible at all. The lack of ROM makes difficult daily activities, such as hygiene, sitting and transportation. The Harris Hip score before the treatment was 27,08% (Kauffman et al., 2007). Based on previous CT scans, patient now has massive HO in the frontal part of left hip area in the soft tissues, that blocks the movement. The same can be seen twenty days before the surgical treatment of the ossificates on a CT scan. (Figures 11, 12 & 13) Due to complete mechanical blockage patient undergoes surgical excision of the ossificates (Figure 14), tenolysis, myolysis, *musculus rectus femoris* separation and reattachment to *spina iliaca anterior inferior.*

Figure 11. Left hip heterotopic ossification, CT sagittal plane.

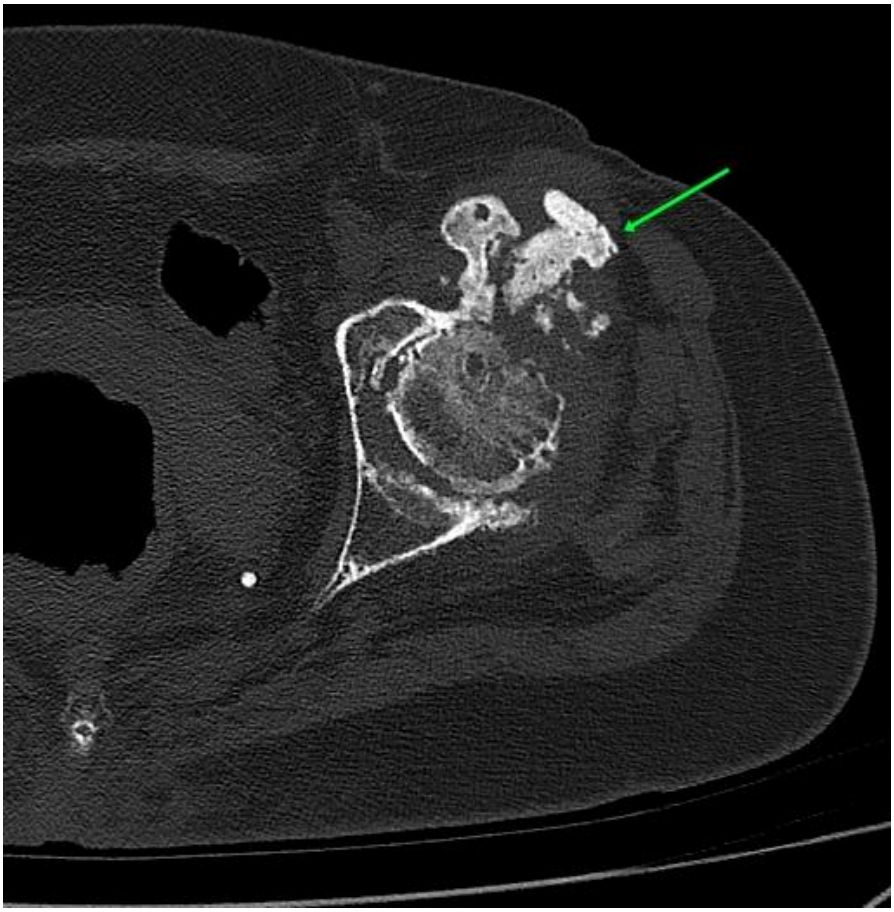

Figure 12. Left hip heterotopic ossification, CT axial plane.

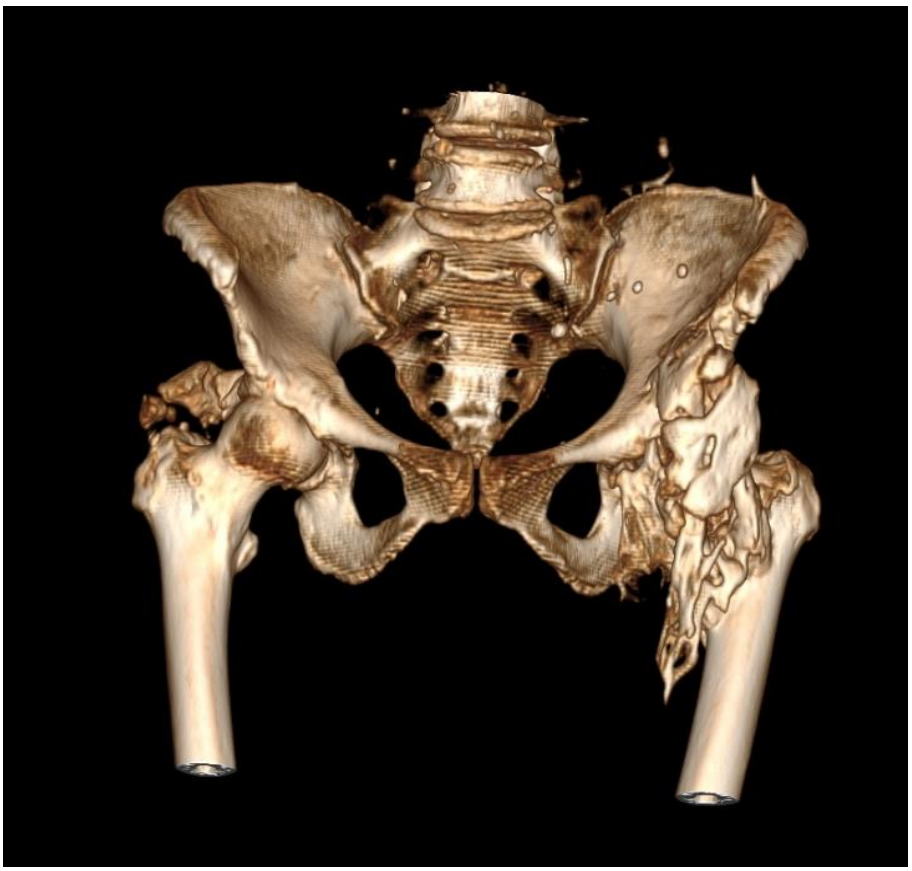

Figure 13. 3D reconstruction of left hip heterotopic ossification.

Figure 14. Excised ossificates.

Figure 15. Passive flexion of RHJ (1) and LHJ before (2) and after (3) surgery.

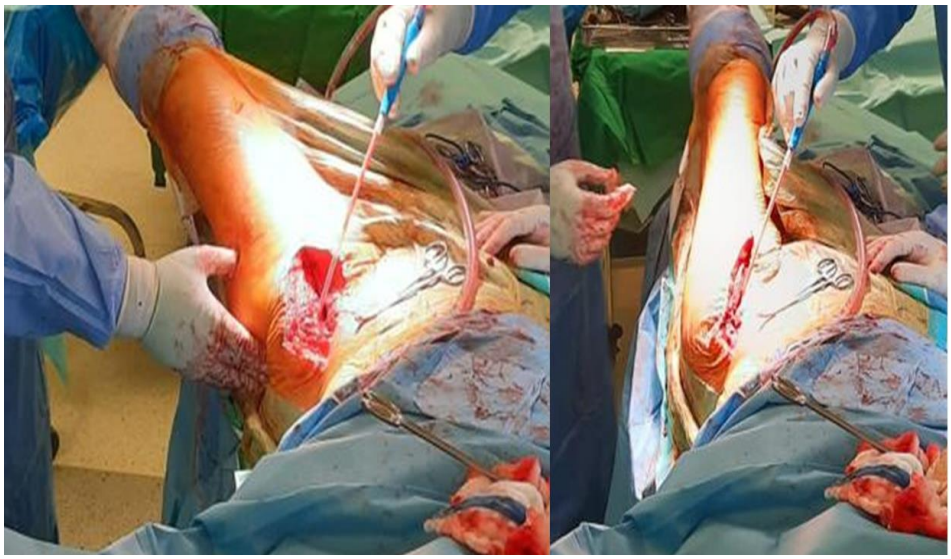

Figure 16. Passive abduction and adduction in LHJ during surgery.

Figure 17. Passive internal and external rotation in LHJ during surgery.

During the procedure, the *nervus femoralis sinistra* was iatrogenically transected and was surgically repaired end-to-end by a microsurgeon. After the HO resection, left hip joint manipulation under anesthesia was performed to increase ROM with achieving – flexion of 90 degrees (Figure 15), abduction and adduction of 25 degrees (Figure 16), internal rotation of 20 degrees, and external rotation of 10 degrees (Figure 17). After the procedure, the patient continued rehabilitation in the Trauma and Orthopedics department for a week and later was transferred to the Rehabilitation clinic for further treatment. The patient had to use foot orthosis for the treatment of left foot contracture obtained after hemiparesis of the left side due to intracerebral hematoma, plantar and dorsiflexion weakness, as well as a knee brace due to *nervus femoralis sinistra* lesion and *musculus quadriceps femoris sinistra* weakness.

Figure 18. LHJ six weeks after surgery, X-ray AP projection.

Figure 19. LHJ six weeks after surgery, X-ray Lauenstein projection.

Twelve weeks after the HO resection, the patient still had not regained full motor and sensory function in the left thigh due to nerve lesion. The flexion in LHJ was retained, but still there was some impairment in abduction and adduction. The foot and knee ROM had improved, and the patient was satisfied with the results and continues rehabilitation to improve independence and ability. The Harris Hip Score after the surgery was 47,80%. Small ossificates could be seen once more in the control X-ray, but did not impair the movement in the joint. (Figure 18 & 19)

Post-Traumatic Left Hip Heterotopic Ossification

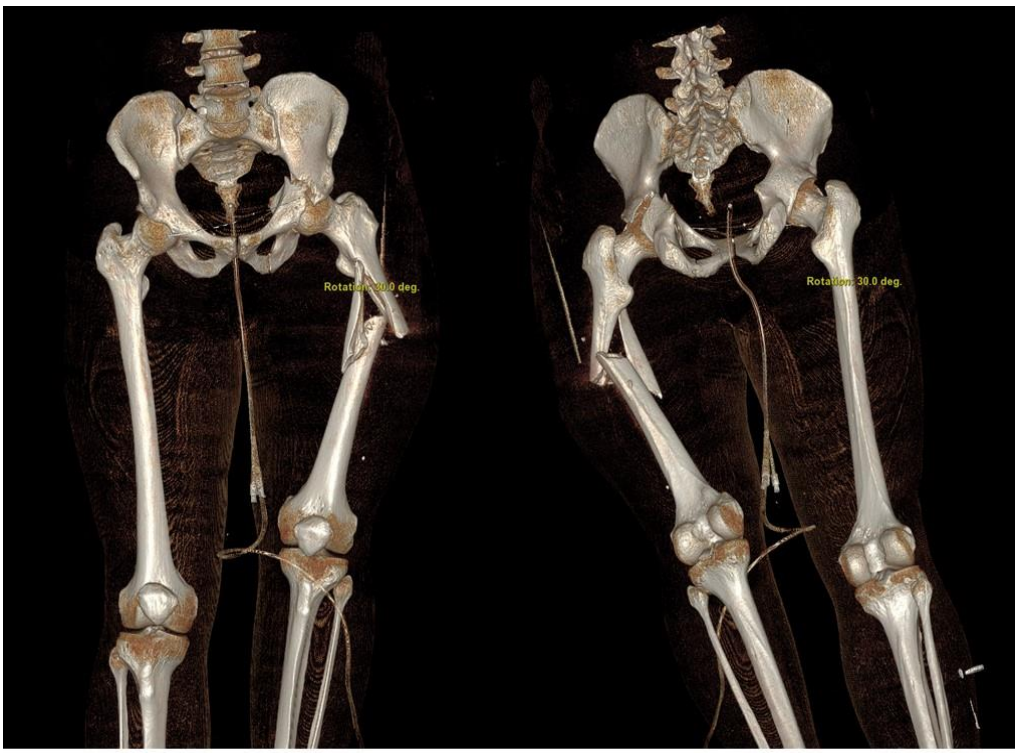

Figure 20. 3D reconstruction of lower limb fractures after polytrauma.

A 34-year-old man was admitted to ED due to polytrauma after a car accident. Upon arrival a full check-up bin accordance to polytrauma protocol standards was performed with a CT scan, confirming subarachnoid hemorrhage, III-degree liver rupture, bilateral multiple rib fractures, left acetabulum T type fracture with dislocation, pelvic ring left side sacroiliac joint dislocation, left femur subtrochanteric multifragmented fracture with dislocation, and left tibia *eminentia intercondylaris* avulsion fracture. (Figure 20.)

A blood sample was drawn and showed blood alcohol level of 2,04 g/L, INR 0,92, Leukocytes 20,78 10^9/L with Neutrophilia (14,60 10^/L) and Lymphocytosis (5,32 10^9/L), mild anemia Hemoglobin 12,10 g/dL, Creatinine 144,33 mkmol/L and Troponin T-HS 45,62 ng/L. No other significant abnormalities were found. The patient continued treatment in the ICU and underwent skeletal traction for temporary fixation of the left femur and acetabular fractures. On the second day Leukocytosis had shrunk twice (11,93 10^9/L) with Neutrophilia 8,96 10^9/L, Hemoglobin had lessened to 10,40 g/dL, ALAT was 713,54 U/L, ASAT 546,14 U/L, CRP had grown to 175,12 mg/L, Creatinine kinase 3045,47 U/L, Procalcitonin 0,519 ng/mL.

On the fifth day after the admission, the patient underwent a mini-open femoral fracture reduction with cerclage wiring and intramedullary osteosynthesis with a proximal femoral nail. The next day the patient underwent open reduction and internal fixation (ORIF) of left sacroiliac joint and anterior part of T type acetabular fracture osteosynthesis with plate and screws through modified iliofemoral approach with *spina iliaca anterior superior* osteotomy. Two weeks later the patient underwent ORIF of the posterior column through the Kocher-Langenbeck approach with plate and screws.

Two weeks after the third surgical intervention, the site of incision showed signs of inflammation. An aspirate from the surgical site was obtained and sent for microbial evaluation. It showed positive for Enterococcus faecalis <10 CFU/mL and *Staphylococcus epidermidis* <1000 CFU/mL. Both strains were multi resistant with confirmed sensitivity to Vancomycin. The blood sample showed Leukocytosis 9,16 10^9/L, Erythrocyte sedimentation rate 43 mm/h, CRP 28,6 mg/L and Procalcitonin 0,062 ng/mL, suggesting an early recognition of the infection. Due to a left acetabulum deep tissue infection a decision on surgical treatment was made and four days later the patient underwent open debridement, irrigation, and drainage. Additional tissue samples for microbial evaluation were taken with four of the six samples coming back positive for *Staphylococcus epidermidis* and one for *Enterococcus faecalis*. Incisional negative pressure wound therapy dressing (NPWT) was implemented. Patient started antibacterial treatment with Vancomycin 1g twice a day and continued it for six weeks.

Three days after the discovery of the deep tissue infection, the patient tested positive for SARS CoV-2 infection with corresponding clinical symptoms, such as fever, cough, sore throat, myalgia and fatigue. Patient was isolated in Covid-19 department and stayed there for ten days. After SARS CoV-2 infection, patients continued treatment in TOD where wounds were healing primarily and NPWT was removed five weeks after the debridement procedure. Postoperative period had no complications, however the patient mentioned a burning sensation in the left foot, suggesting *n. ischiadicus sinistra* lesion. Five days later the patient was discharged to continue treatment at home.

Two years after the trauma and the following treatment, the patient returns to TOD complaining of impaired movement in LHJ, the only possible movement being active flexion of the hip for no more than 70 degrees with neutral abduction and adduction. An X-ray discovered HO in the left hip of the patient. (Figure 21 & 22) The Harris Hip Score before surgical treatment was 76,50, which is high; however, the limitation of movement impaired patients' ability for daily functioning as well as job duties. The patient was informed about possible complications and risks of a surgical intervention and agreed to surgical treatment.

The patient underwent an open left hip joint frontal and lateral HO resection with partial *m. rectus femoris* separation and refixation to *spina iliaca anterior inferior* and placement of deep surgical drains. After HO resection, the patient was prescribed Aspirin 100 mg two times a day for deep venous thrombosis and HO prophylaxis and indomethacin 75 mg once a day for two weeks.The drain was removed upon lessening of the drained fluid and the patient was discharged three days after the surgery with provided recommendations.

Twelve weeks after the treatment, the patient was satisfied with the results and the control X-ray showed no HO recurrence. (Figure 23) ROM had increased to 100 degree flexion in neutral abduction and adduction position. *N. ischiadicus* neuropathy had also lessened. The Harris hip score had grown to 95%.

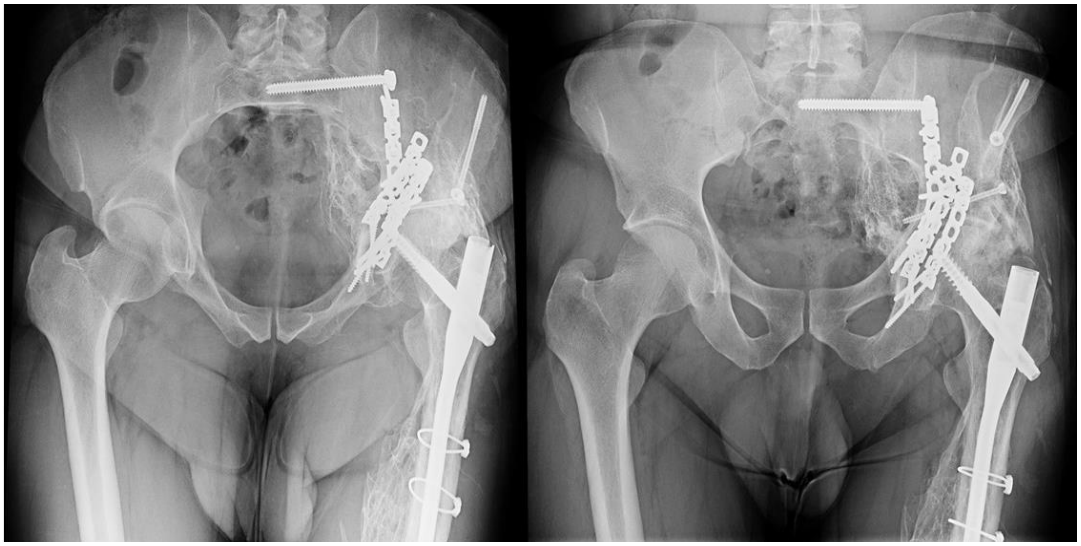

Figure 21. Heterotopic ossification of LHJ, inlet and AP projection, X-ray

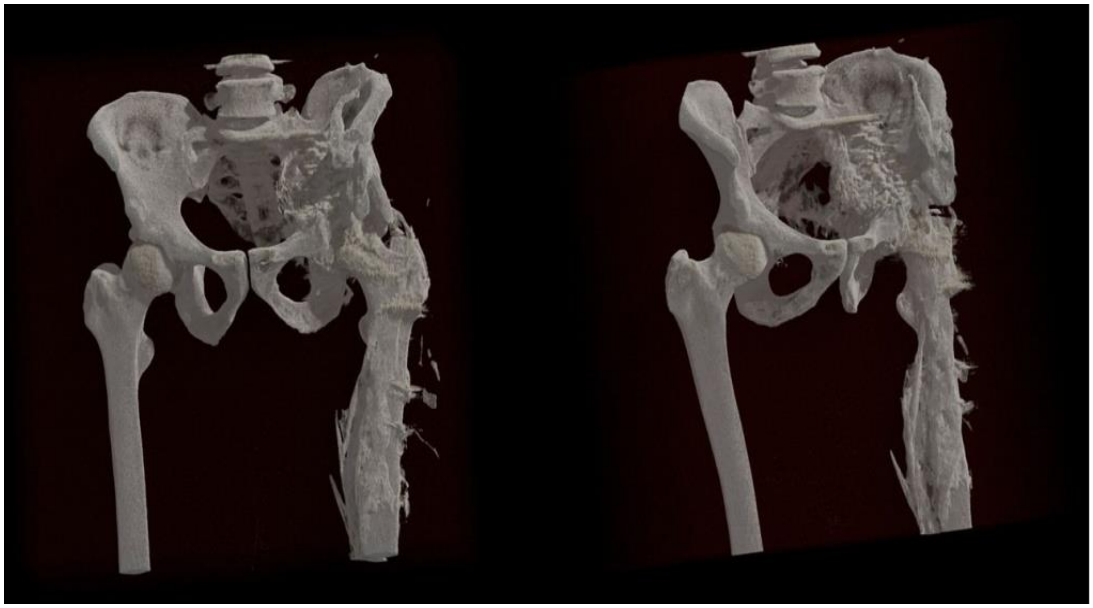

Figure 22. LHJ HO 3D reconstruction.

Figure 23. LHJ HO, X-ray Lauenstein, AP projection.

Discussion

In this report a case of mixed origin and posttraumatic heterotopic ossification were reported. Although the surgical treatment usually is not the first line treatment, in these cases it showed a beneficial outcome for the patients with increased quality of life, functioning and regained ROM in the left hip joint afterwards. The resection was done nine months after the initial arrival in hospital and eight months after first sighting of the HO in patient imaging results and two years after the initial trauma for the second patient.

Surgical treatment is not the first line of treatment in HO cases due to risks associated with postoperative complications as well as the recurrence of the ossification. It is suggested to perform it in cases where there is lack of clinical improvement with nonoperative treatment and appearance of progressive disability. (Ranganathan et al., 2015)

An early functional surgery without waiting for "cold" appearance on bone scintigraphy does not affect the recurrence of the ossification. (Genêt et al., 2012; Genêt et al., 2015; Denomandie et al., 2018; Vasileiadis et al., 2015). Furthermore, surgery should not be delayed in case of complete joint ankylosis or joint fusion that brings more destructive outcomes upon the patient. The loss of ROM in the patient should be a more important factor than waiting for maturation of the ossificates. It was found that early surgical intervention minimizes the development of intra-articular pathology, osteoporosis and the resultant complications without increasing the risk of recurrence of HO. (Genet et al., 2009) The patients should however be consulted on the risks due to potential injury of the surrounding soft tissue, such as delayed wound healing, infection, nerve injury and recurrent contracture. The opinions in literature on the timing of the ossificate resection varies depending on the origin of the pathology, in case of traumatic HO suggesting resection at six to nine months and in case of neurogenic HO at 18 months. (Mavrogenis et al., 2011; Ranganathan et al., 2015)

Some of the risk factors mentioned in the literature for the recurrence of HO are incomplete resection and not waiting for complete maturation, since some isles of developing ossificates can be unseen both radiographically and during surgical resection. It was found that resection done before 180 days post injury had a higher risk of recurrence in patients with traumatic amputation induced HO (Pavey et al., 2015). Another issue is the increased risk of infection due to the newly-formed bone being a highly vascularized structure. As surgical intervention itself can induce an inflammatory state and increase the risk of recurrence, the timing of the surgery is still debatable. Moreso the results of recurrence of HO following traumatic brain injury is inconsistent both in time and magnitude. (Davis et al., 2013; Juarez et al., 2018).

Nevertheless the pre and post operative prophylaxis with indomethacin and radiation therapy seems to produce beneficial results for the patient. There are several studies that have focused on different NSAIDs both selective and non selective and thus far indomethacin has shown the highest benefit. However, aspirin or acetylsalicylic acid has shown beneficial effects on occurrence of HO, especially after hip arthroplasty. Based on its wide spectrum of pharmacological effects, it can alleviate pain, reduce risk of venous thrombosis and occurrence after surgical removal of HO (Nunley et al., 2011; Wang et al., 2023). The studies mentioned did not focus on HO after traumatic or neurogenic incident and several other studies also showed beneficial effects of other NSAIDs such as ibuprofen, celecoxib, dexketoprofen with highest benefit from indomethacin and celecoxib (Migliorini et al., 2020; Legosz et al., 2019).

Conclusion

In conclusion surgical treatment of HO in patients with good expected outcomes and high involvement in their own rehabilitation should be at least considered. It is important to emphasize both pre and postoperative rehabilitation and prophylaxis. Several factors should be considered before the surgery, including the origin and risk factors of HO, available data on recurrence and bone maturation in these patients as well as risks following the surgery.

Scientific Ethics Declaration

The authors declare that the scientific ethical and legal responsibility of this article published in EPHELS journal belongs to the authors.

Acknowledgements or Notes

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* The authors express gratitude to the patients for consenting to the publication of this case report.

Footnotes

All figures submitted have been created by the authors who confirm that the images are original with no duplication and have not been previously published in whole or in part.

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