See No Motion, Feel No Motion, Experience No Motion: Using OMT to Treat Heterotopic Ossification in a Patient with Hemispatial Body Neglect: A Case Study

Clayton Bunting, OMS-IV, Philadelphia College of Osteopathic Medicine (PCOM); Michael Smith, DO, University of Pittsburgh Medial Center (UPMC)

INTRODUCTION

-Heterotopic Ossification: Heterotopic ossification (HO) is the presence of bone in soft tissue where bone normally does not exist. The acquired form of HO most frequently is seen with either musculoskeletal trauma, spinal cord injury, or central nervous system injury. Among patients with closed head injury, HO develops in 10%–20%, and in 10% of these patients with HO, limitations in joint motion will develop(1). HO can lead to significant disability and functional impairment. HO initially manifests as pain and joint stiffness. Early diagnosis requires appropriate suspicion and imaging studies to detect the uncalcified collagen matrix that forms in the early stages of NHO.

-Hemispatial Neglect resulting from IPH: Hemispatial neglect is a common disabling condition following unilateral brain damage, particularly of the right hemisphere. Although it can be caused by various different pathological conditions, it is most often observed after cerebral infarction or hemorrhage and affects up to two thirds of right hemisphere stroke patients acutely. Hemispatial neglect is characterized by reduced awareness of stimuli on one side of space, even though there may be no sensory loss (2). Although it is extremely common, it has proven to be a challenging condition to understand and to treat.

HISTORY OF PRESENT ILLNESS

-75 year old woman with prior history of hypertension, anxiety/depression, prior hemorrhagic stroke.
-The patient presented with left arm and leg weakness. She later developed left facial droop and left sensory deficits.
-Computed tomography (CT) scan of head revealed right frontal lobe hemorrhage.
-Patient began to experience increased lethargy and repeat CT showed right sided basal ganglia intracerebral hemorrhage and increased local mass effect and approximate 4 mm midline shift.
-Electroencephalogram revealed right hemispheric dysfunction.

PHYSICAL EXAM

-On presentation, she complained of 10/10 left hip pain.
-Range-of-motion testing revealed hip flexion and abduction to 10° and 15°, respectively, limited by pain.
-No left lower extremity muscle activation was appreciated.
-Osteopathic examination revealed a left posteriorly rotated and inflared innominate, left-on-right sacral torsion, and hypertonicity at the left iliopsoas and piriformis musculature.

DIAGNOSTICS

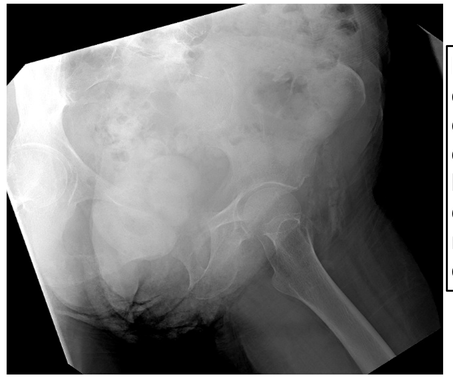

Image 1. Left Pelvic radiograph of 75 year old woman displaying immature heterotopic ossification anterior to the left hip. The findings also include diffuse osteopenia, as well as mild left hip and sacroiliac joint osteophyte arthritis.

TREATMENT

-A treatment protocol was initiated concentrating on passive direct and indirect osteopathic medical treatment techniques. Considering the patient's hemineglect, there was repeated redirection of patient's attention to the neglected side, hoping the direct visualization would improve the treatment response.
-After initial treatment, pain decreased to 4/10. Hip flexion and abduction improved to 75° and 40°, respectively. Motor responses were elicited in gravity-eliminated states. Improved attention was noted in the neglected side.
-Indomethacin was started to target HO related pain, however patient noncompliance became an issue. Bisphosphonate was started but ultimately ceased due to the side effect profile of gastric upset.

TREATMENT APPROACHES FOR HO

Mediations
- NSAIDS: Indomethacin historically has been the gold standard for treatment, however definitive duration and dosing regimen has not been definitively proven. Studies have also shown ibuprofen, diclofenac, ketorolac, and recently COX-2 inhibitors such as celecoxib to be beneficial (3).
- Bisphosphonates: Found to be efficacious in the treatment of previously diagnosed HO.
- Warfarin: The well known anticoagulant has been shown in a single retrospective study to reduce the development of HO in patients post spinal cord injury.

Radiotherapy
- Involves the irradiation of pluripotent mesenchymal cells, thought to the be responsible for the formation of heterotopic bone.
- Typically treated with a doses between 2 to 10 Gy (4)
- Studies show that radiotherapy stops primary and secondary progression of HO.

Physical Manipulation
- There is no clear understanding or studies on the significance of physical manipulation in the setting of HO and management differs based on clinical preference.
- The use of OMT in patients with atypical and unique presentations of HO may be extremely beneficial, as they have fewer management options. In our experience it increases range of motion, while also producing substantial neurological effects on the effected limb.

Surgical Excision
- Often done after osseous maturation is complete, typically around 6 months. Increased risk of recurrence of HO when resection is done prior to 6 months.
- Unfortunately complete excision is not always practical or possible due to the fact that HO does not respect natural anatomical barriers and often entraps neurovascular structures leading to incomplete resection, which is also associated with recurrence.

DISCUSSION

Annually, 795,000 Americans experience a stroke. Hemispatial neglect is observed in up to 82% of patients with right-hemisphere strokes. This case explores the effectiveness of a personalized multimodal treatment approach involving both osteopathic manipulative treatment (OMT) as well as visualization awareness, for pain and mobility associated with HO in patients with body-hemineglect syndrome.
There is a paucity of literature on OMT for treating pain in body-hemineglect syndrome. Given the nature of hemineglect syndrome, traditional active techniques cannot be utilized; therefore, there is an opportunity to further explore the use of OMT in this sequelae of stroke. Compared to the few prior case studies focusing on the rehabilitation of patients with HO in large joints suffering from hemineglect, our personalized treatment approach involving OMT showed greater motion and pain improvement in one initial treatment compared to 4 weeks of traditional inpatient rehabilitation. A limitation of this case included only one OMT session performed as the patient was discharged shortly after treatment with no osteopathic follow-up. Additionally, results were confounded, as multiple modalities were prescribed, including physical therapy and NSAID analgesics. Nevertheless, immediate improvement in pain-scores and range-of-motion support that OMT was effective in treating hip HO in patients with body-hemineglect syndrome.
Future studies with larger sample sizes and long term follow up will hopefully elucidate the beneficial aspect of OMT on both the range-of-motion as well as the pain-scores when compared to current treatment modalities for those patients with HO and concurrent hemispatial neglect.

CONCLUSION

Osteopathic manipulative treatment is an effective and practical treatment modality that can improve mobility and pain in a variety of musculoskeletal complaints. This case lends support that osteopathic manipulation can be an effective and safe treatment modality in patients suffering from HO-related pain with hemispatial neglect.

REFERENCES

1. Garland DE. A clinical perspective on common forms of acquired heterotopic ossification. Clinical Orthopaedics and Related Research. 1991 Feb(263):13-291
2. Parton A, Malhotra P, Husain M. Hemispatial neglect. *J Neurol Neurosurg Psychiatry*. 2004;75(1):13-21.
3. Meyers C, Lisiecki J, Miller S, et al. Heterotopic Ossification: A Comprehensive Review. *JBMR Plus*. 2019;3(4):e10172. Published 2019 Feb 27. doi:10.1002/jbm4.10172
4. Shehab D, Elgazzar AH, Collier BD. Heterotopic ossification. J Nucl Med. 2002 Mar;43(3):346-53. PMID: 11884494.