

Heterotopic ossifications in CoVid-19 patients: a series of 4 cases

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Background

Heterotopic ossifications (HO) are abnormal formation of mature lamellar bone in soft tissues around proximal articulations inducing muscular and articular pain, joint ankylosis and loss of independence. HO is commonly described in patients after central (traumatic brain injuries, stroke and spinal cord injuries) and peripheral (Guillain-Barré syndrome) nervous system lesions.

Cases

We present 4 cases of patients suffering from an SARS- COV-2 infection (CoVid-19 disease) who necessitated mechanical ventilation presenting HO in hips and shoulders.

Diagnostic

Diagnosis was suspected by clinical examinations and confirmed by medical imagery (bone scintigraphy and CT-scanner). In the early stage (2–6 weeks), nuclear bone scans are more sensitive than plain radiography to detect HO, whereas CT allows for better visualization of the heterotopic bone (2). Laboratory investigation may reveal elevated alkaline phosphatase and creatine phosphokinase levels.

Treatment

Early and continuous mobilization and rehabilitation are essential in the management of HO and CoVid-19 disease. Non-steroids anti-inflammatory and bisphosphonates are proposed as a prophylactic treatment. Surgical excision should be performed when joint limitation affects autonomy and quality of life and comorbid factors are under control.



Fig. 1



Fig. 2

Fig. 1 (patient 2):
Left hip 3-D CT scan: immature heterotopic ossifications in the left enlarged iliopsoas and obturator externus muscles.

Fig. 2 (patient 3):
Left hip CT scan: immature heterotopic ossifications in the left iliopsoas muscle.

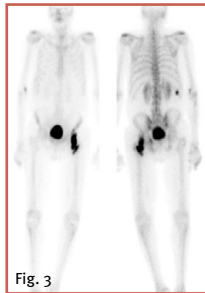


Fig. 3



Fig. 4

Fig. 3 (patient 3):
Bone scintigraphy: left hip hyperfixation.

Fig. 4 (patient 4):
Right shoulder X-ray: mature heterotopic ossifications in the supraspinatus muscle.

	Case 1 male	Case 2 male	Case 3 male	Case 4 male
Age	64 year-old	73-year-old	74-year-old	39-year-old
Localisation	Hip (bilateral)	left hip HO peri-articular and intra-muscular ossification in the quadratus femoris, iliopsoas, adductor magnus and external obturator muscle	left hip HO in the quadriceps femoris muscle and iliopsoas muscle	Shoulder (bilateral). Mature heterotopic ossifications in the right supraspinatus muscle
Comorbidities	-High blood pressure-Atrial fibrillation-Cervical myelopathy	-High blood pressure -Chronic obstructive pulmonary disease	-High blood pressure -Chronic obstructive pulmonary disease	-schizophrenia, -bipolar disorder- alcohol abuse
Mechanical ventilation and prone positioning	26 days	27 days	30 days	28 days
Other complications	-sensory-motor polyneuropathy in lower limbs-right brachial plexus lesion	- sensory-motor polyneuropathy in lower limbs- deep vein thrombosis of the left superficial femoral and popliteal veins	/	/
acute pain and joint limitation	At day 39	At day 40	At day 41	At day 30
Alkaline phosphatase elevation (normal range 34-126 UI/l)	200 UI/l	126 UI/l	105 UI/l	200UI/l

Discussion

HO is highly dependent on inflammation and phagocytic macrophages in soft tissues while SARS-CoV-2 may modulate macrophage-mediated events. One may hypothesize that CoVid-19 global inflammation may play a role in HO genesis. The fact that most of our patients suffered from a severe form of CoVid-19 disease reinforces such hypothesis. Another common factor between CoVid-19, traumatic brain injury and spinal cord injury (known to cause HO) is the prolonged immobilization.

Conclusion

HO is a diagnosis that should be considered in CoVid-19 patients with prolonged immobilization in the presence of a painful joint. We suspect that HO could be underdiagnosed in patients suffering from CoVid-19 disease requiring intensive care. Early management is aimed at limiting its progression and maximizing function of the affected joint. Diagnosis is based on clinical manifestations and must be confirmed by medical imaging. Further studies on the impact of invasive ventilation, hypoxia and metabolic disorders on the development of HO are required. Considering the potential functional impairments early diagnosis and management of this entity is a must.