Case report

Unusual myositis ossificans and additional calcification in the gluteal region caused by intramuscular injection as a reason for sciatica?

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ABSTRACT

Treatment of sciatica can be difficult due to unknown pain origin. During a routine dissection of a left gluteal region of an 83-year old male cadaver we found an unusual unique case of multiple calcifications. The tendon of the obturator internus was calcified from lesser pelvis to its insertion at the trochanteric fossa. Additionally, calcification originating from the piriformis tendon in vertical direction, parallel to the sciatic nerve course with a length of 4 cm distally tapered, was found. The proximal base had a width of 2.5cm. The sciatic nerve was located between these two calcifications. The patient mentioned left leg sciatica only once, which unfortunately was combined with a severe peripheral arterial disease (PAD) grade IV on both legs. PAD was treated including a lumbar sympathetic block. Retrospective analysis of a pelvic computerized tomography (CT) investigation, performed 3 years premortem, of the lumbar vertebral column showed the aforementioned ossifications which remained undiagnosed. Three samples (obturator internus [OI], coxal bone [CB] and vertical ossification [VO]) were taken and elements were analyzed. OI and CB were similar whereas the VO was entirely different. In case of inexplicable ischialgia, a myositis ossificans, probably caused by a dislocated intramusclular injection, has to be taken into consideration.

KEYWORDS: myositis ossificans; sciatica; intramusclular injection; ischialgia; cadaver

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INTRODUCTION

Sciatica partially is a very life disturbing disease where the cause for ischialgia might not be detectable easily. In a high number of the cases the reason for this is assumed by disc herniation (1). However, in some cases the cause might be a rare one because of a high velocity gun shot (2) or even undetectable. We would like to present a case, where a unique formation of ossification due to a misguided intramuscular injection caused sciatica with a very high probability.

CASE REPORT

During a routine dissection of a left gluteal region of an 83-year old male cadaver fixed with Thiel`s method (3) we found an unusual unique case of multiple ossifications. The tendon of the obturator internus (OI) was ossified starting in the lesser pelvis, continuing along its hypomochlion in the lesser sciatic foramen and almost its entire transversally directed course close to its insertion at the trochanteric fossa. A second ossification was documented to originate from the piriformis

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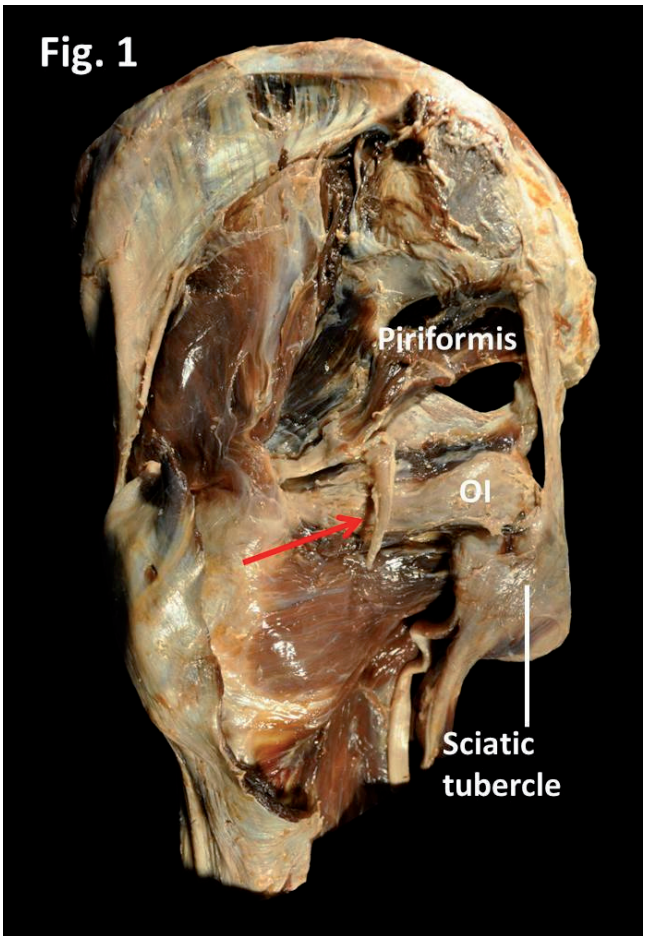

Figure 1. Dorsal view of a gluteal region. The second ossification, not corresponding to any normal anatomical structure, is marked with the arrow. OI = obturator internus.

tendon in vertical direction, parallel to the sciatic nerve course with a length of 4 cm distally tapered. The proximal base had a width of 2.5 cm (figure 1). The sciatic nerve was located between these two ossifications. Dissection was followed by computerized tomography (CT) to document the 3D extension of these ossifications (figure 2).

Figure 3. In vivo CT image three years premortem (10/2007). Ossifications (arrows) are clearly visible but remained undiagnosed because the main area of interest was lower spine area.

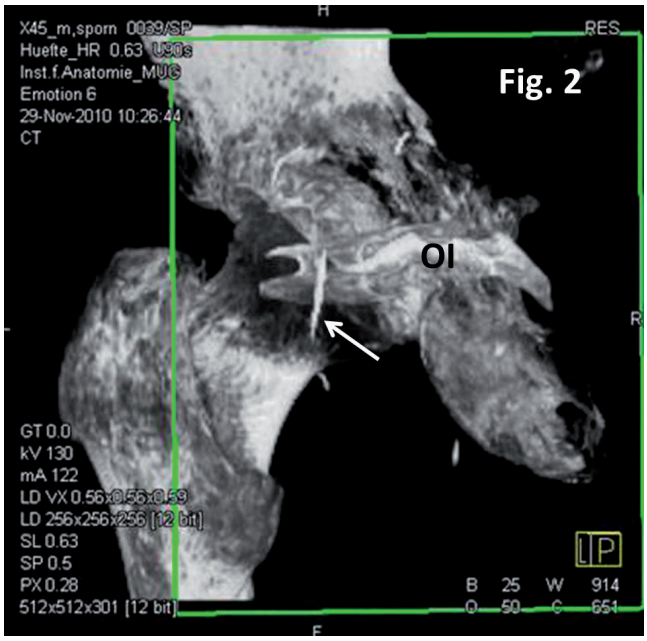

Figure 2. CT 3D reconstruction of the ossifications of the same specimen as in Figure 1. Vertically directed ossification is marked with an arrow. OI = obturator internus.

To find the reason for this ossification, we ordered the medical history of the patient. The request was approved by the local ethical commission (approval with the 18th October 2010). Medical history showed that the patient mentioned a left leg sciatica only once, four years premortem (diagnosed as a contusio coxae sin. non rec.). The patient developed PAD grade IV on both legs which covered this sciatica and lead to amputation of the right crus two years premortem. PAD was treated including a lumbar sympathetic block. In addition the patient suffered coronary heart disease, short bowel syndrome, mesenterial infarction, chronic obstructive pulmonary disease (COPD), prostate cancer and steatosis hepatis. Retrospective analysis of a pelvic computerized tomography (CT) investigation, 3 years prior to death, of the lumbar vertebral column showed the aforementioned myositis ossificans which remained undiagnosed (figure3). To search for a possible reason for the ossification we took three samples (obturator internus [OI], coxal bone [CB] and vertical ossification [VO]) and analysed them elementarically. OI and CB were similar whereas the VO was entirely different (table 1). VO significantly differed from CB and OI in the concentration of the elements calcium, phosphate, potassium, magnesium, lead and others. Similar concentrations VO and OI were documented with the elements iron and cobalt. OI and CB was similar in concentrations of asbestos and boron.

Table 1. Element analysis of three samples.

		Sample CB*		Sample OI*		Sample VO*	
Element	Unit	Mean	SD	Mean	SD	Mean	SD
Ca	g/kg	130.00	4.00	128.00	1.00	87.20	2.10
P	g/kg	50.30	1.40	49.60	0.40	33.50	0.80
Na	g/kg	10.02	0.31	10.00	0.15	10.51	0.27
K	g/kg	5.02	0.13	5.08	0.06	6.44	0.14
B	g/kg	3.42	0.13	3.84	0.04	3.44	0.09
Mg	g/kg	1.24	0.03	1.19	0.01	0.88	0.02
Fe	mg/kg	255.00	4.00	182.00	1.00	173.00	2.00
Sr	mg/kg	23.99	0.31	24.55	1.43	15.19	0.56
Pb	mg/kg	16.18	0.60	14.91	0.09	6.05	0.21
Ni	mg/kg	6.21	0.33	1.49	0.04	2.69	0.18
Ba	mg/kg	5.28	0.22	6.45	0.47	3.55	0.38
As	mg/kg	2.79	0.03	3.40	0.08	2.56	0.14
Al	mg/kg	2.52	0.44	4.28	0.60	2.35	0.24
Mn	mg/kg	1.31	0.02	1.18	0.02	0.86	0.05
Rb	mg/kg	0.689	0.047	0.702	0.044	0.898	0.063
Cu	mg/kg	0.234	0.088	0.158	0.028	0.312	0.053
Li	mg/kg	0.126	0.004	0.146	0.004	0.110	0.009
Cr	mg/kg	0.117	0.009	0.096	0.013	0.192	0.017
Mo	mg/kg	0.070	0.007	0.081	0.018	0.048	0.017
Co	mg/kg	0.024	0.003	0.005	0.003	0.009	0.005
U	mg/kg	0.019	0.002	0.018	0.002	0.009	0.001

*CB = coxal bone, OI = obturator internus, VO = vertical ossification.

DISCUSSION

Sciatica is a reason of many different diseases (1,4). This might lead to a difficult search and long lasting inefficient treatments. Unusual ossifications are no new reasons causing sciatica. Darmoul et al. (5) reported disc calcifications after multiple intradiscal injections of triacinolone hexacetonide. As such calcification might result in 14 to 68% of injections, any solution should be evaluated in risk of calcifying before being applied. However, we certainly are aware that this information cannot be provided in many cases. Therefore the presented case is an important contribution that the documented VO might be a result of a misguided intramuscular injection with high probability. Our suspicion is reinforced by different arguments. First, the topography and the shape of the VO do not correspond to any regular structure in the human body. After literature research we could not find any even similar muscular variation or ossification. The VO in addition was found in the soft connective tissue sheath between the gluteus maximus and the obturator internus. As it covered the sciatic nerve in its course distally it can be confirmed to be in the same layer as the nerve itself. The VO followed the epineural sheath of the sciatic nerve but was not part of it. Additionally it can be excluded that this ossification happened during the embalming process

because the ossification was already developed 3 years premortem, visible in CT images but remained undetected.

A second reinforcement is that calcifications caused by injections are pretty well confirmed in literature (5–9). Most reports showed calcification after gluco-corticoid or corticosteroid injection. Boissiere et al. (10) documented lumbar synovial cyst calcification after intra-articular injection of prednisone. In the gluteal region, Gilles and Matson (11) reported crystalline depositions, dense scarring and fibrotic changes. Due to the fact that different agents can cause calcifications, a misguided intramuscular intragluteal injection of the Method of Hochstetter of other injectate might lead in a possible inflammatory reaction. Such agents are vaccines and steroids, listed by Kline et al. (12). Moreover, it can be strongly assumed by the performed element analysis that the significant lower concentration of anorganic elements such as calcium and phosphate in the VO indicates a soft tissue reaction mentioned above with a disproportional increase of organic material concentration. We have to state, that an element analysis has not been provided in any publication concerning the affection of the sciatic nerve due to a misguided intragluteal injection ever before. So we are able to safely say that the documented ossification was developed because the guidelines for an intragluteal injection technique of Hochstetter were not followed properly. Schmidt (13) described the anatomical and clinical testing of the intragluteal injection of Hochstetter and mentioned a higher risk of affecting the sciatic nerve even if the injection site is determined in the superior posterior quadrant of the gluteal region and the needle being advanced in a wrong direction. What is more, if the medial and caudal and therefore wrong quadrant is selected and in case that the needle peak is positioned deep to the gluteus maximus it would cause a spread in the same layer as the presented ossification was found. This is confirmed by the morphology of the VO with its base in the piriformis were the needle peak was positioned with high probability. In addition the vertical spread assumes a standing position during this injection.

Summarizing, the element analysis of the unique vertical ossification showed a significantly different composition to all other bony elements in the specimen. In combination with shape and topography there is a very high probability being a proof that this is caused by a misguided intragluteal injection which caused the patient's sciatica.

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