



CASE REPORT

Assessment of traumatic leptomeningeal cyst in forensic anthropology – A case report

Pavel Timonov^{a,*}, Antoaneta Fasova^b, Ivan Tsranchev^a, Maria Koleva^a,
Irina Brainova-Michich^c, Ayse Hazal Oluk^d

^a Department of General and Clinical Pathology and Forensic Medicine, Medical Faculty, Medical University-Plovdiv, 15a Vassil Aprilov Blvd., 4000 Plovdiv, Bulgaria

^b Department of Anatomy, Histology and Embryology, Medical Faculty, Medical University-Plovdiv, 15a Vassil Aprilov Blvd., 4000 Plovdiv, Bulgaria

^c Department of Forensic Medicine and Deontology, Medical University-Sofia, 2 Zdrave Str., 1431 Sofia, Bulgaria

^d Medical University-Sofia, 2 Zdrave Str., 1431 Sofia, Bulgaria

Received 9 April 2016; revised 16 May 2016; accepted 16 May 2016

KEYWORDS

Forensic anthropology;
Leptomeningeal cyst;
Cranial fractures;
Gunshot injury

Abstract Paleopathology is a very extensive subject. Sometimes some pathological changes of bones may mimic trauma. This paper demonstrates a rare complication of cranial fractures which may be mistaken with gunshot injury in skeletonized remains.

© 2016 The International Association of Law and Forensic Sciences (IALFS). Production and hosting by Elsevier B.V. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

1. Introduction

Pathological changes of bones and normal skeletal variations may mimic trauma and it is important that the analyst should have an intimate knowledge of the normal appearance and pathological changes that can occur in a skeleton. The age, sex and ancestry of the individual should preferably be known before an attempt is made to diagnose a specific condition, as many diseases may be more prevalent in a specific sex or age

group.¹ These cases need an experienced anthropologist or osteologist to provide accurate identification. We report a medicolegal case of large intradiploic leptomeningeal cyst in adult, which mimic a gunshot to the head.

Post-traumatic leptomeningeal cysts are a rare complication of cranial fractures. Most of these cysts are due to blunt head trauma in childhood prior to the age of three. A dural tear and fracture of the inner table are probably important factors, causing pulsation of the brain through the torn dura. The arachnoid bulges through the defect as a result of pulsating cerebrospinal fluid (CSF), the cyst develops over several years and the enlargement of the cyst results in resorption of adjacent bone, erosion of the bone edges and widening of the skull fracture.^{2,3}

* Corresponding author at: Department of General and Clinical Pathology and Forensic Medicine, Medical University-Plovdiv, 15a Vassil Aprilov Blvd., 4000 Plovdiv, Bulgaria. Tel.: +359 888409590.
E-mail addresses: paveltimonov@yahoo.fr (P. Timonov), antoaneta_joan@yahoo.com (A. Fasova).

Peer review under responsibility of The International Association of Law and Forensic Sciences (IALFS).

<http://dx.doi.org/10.1016/j.ejfs.2016.05.009>

2090-536X © 2016 The International Association of Law and Forensic Sciences (IALFS). Production and hosting by Elsevier B.V.

This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).



Figure 1 A small round defect on the left parietal bone.

2. Case report

A 73 year old man was found dead at home with decompositional changes. He had no apparent injuries. The soft mass was located on the left parietal area. His son was questioned for previous head injury of his father and he mentioned a severe head injury after falling to the ground at the age of 60 years. He remembered that his father had been unconscious for several seconds after the injury.

A midline scalp incision was made to expose the subparietal mass. The left parietal bone had a small round defect surrounded by a sclerotic bony margin like a crater (Fig. 1). There was a dural defect producing a free communication between the cyst and the subarachnoid space. Histologically are found bone with degenerative changes and skin, presented by superficial epidermis and underlying dermis also with degenerative changes.

Autopsy demonstrated the man to have a massive intraabdominal hemorrhage caused by rupture of the abdominal aortic aneurysm.

3. Discussion

Development of a post-traumatic leptomenigeal cyst can take anywhere from several weeks to several years to occur after the trauma.^{3,4} Dural laceration that accompanies the skull fracture is the mechanism of this complication. Laceration of dura mater leads to herniation of the leptomeninges, which in turn fills with CSF. The continuous pulsatile pressure of CSF and the enlargement of the cyst result in resorption of adjacent bone, erosion of the bone edges and widening of the skull fracture.³⁻⁵ The parietal region is the most common location in both the adult and pediatric populations.⁶

In forensic cases such lytic lesions with surrounding sclerosis may be confused with a gunshot injury. In cases where the

soft tissue is preserved it is relatively easy to determine the leptomenigeal cyst compared to the examination of skeletonized remains.

4. Conclusions

In conclusion, post-traumatic leptomenigeal cyst is rare, but it should be considered when an erosive defect in the skull is found, particularly in the parietal region and a prior history of head trauma.

Funding

None.

Conflict of interest

None declared.

References

1. Iscan MY, Steyn M. *The human skeleton in forensic medicine*. Charles C. Thomas Publisher; 2013.
2. Seo BR, Lee JK, Jeong IH, Moon SJ, Loo SP, Kim TS, et al. Post-traumatic intradiploic leptomenigeal cyst of the posterior fossa in an adult. *J Clin Neurosci* 2009;**16**:1367–9.
3. Guler I, Buyukterzi M, Oner O, Tolu I. Post-traumatic leptomenigeal cyst in a child: computed tomography and magnetic resonance imaging findings. *J Emerg Med* 2015;**48**(5):121–2.
4. Hoon K, Kwang Wook J. Treatment of a traumatic leptomenigeal cyst in an adult with fibrinogen-based collagen. *J Korean Neurosurg Soc* 2013;**53**:300–2.
5. Khandelwal S, Sharma GL, Gopal S, Sakhi P. Growing skull fractures/leptomenigeal cyst. *Indian J Radiol Imaging* 2002;**12**(4):484–6.
6. Britz GW, Kim DK, Mayberg MR. Traumatic leptomenigeal cyst in an adult: a case report and review of the literature. *Surg Neurol* 1998;**50**(5):465–9.

Web references

7. *J Clin Neurosci* 2009 Oct;162009 Oct–9. <http://dx.doi.org/10.1016/j.jocn.2008.10.018> [Epub 2009 Jun 24].
8. *J Emerg Med* 2015 May;482015 May–2. <http://dx.doi.org/10.1016/j.jemermed.2014.12.042> [Epub 2015 Feb 3].
9. *J Korean Neurosurg Soc* 2013 May;532013 May–2, English. Published online May 31, 2013. <http://dx.doi.org/10.3340/jkns.2013.53.5.300>.
10. Khandelwal S, Sharma GL, Gopal S, Sakhi P. Growing skull fractures/leptomenigeal cyst. *Indian J Radiol Imaging* 2002;**12**:485–6. Available from: <http://www.ijri.org/text.asp?2002/12/4/485/28518>.
11. Britz GW, Kim DK, Mayberg MR. Traumatic leptomenigeal cyst in an adult: a case report and review of the literature. *Surg Neurol* 1998;**50**(5):465–9. [http://dx.doi.org/10.1016/S0090-3019\(97\)00233-4](http://dx.doi.org/10.1016/S0090-3019(97)00233-4).