

## CLINICAL CASE - TEST YOURSELF Musculoskeletal Imaging

# Lytic skull lesions in a middle-aged man

Aspasia Polanagnostaki<sup>1</sup>, Theofilos Chrysanthis<sup>2</sup>, Panagiotis Prassopoulos<sup>1</sup>

<sup>1</sup>Radiology Department, AHEPA University Hospital of Thessaloniki, Greece

<sup>2</sup>1<sup>st</sup> Internal Medicine Department, AHEPA University Hospital of Thessaloniki, Greece

SUBMISSION: 3/8/2020 | ACCEPTANCE: 6/11/2020

## PART A

A 55-year-old male presented at the Emergency Department with severe headache. He reported ache, starting 15 days earlier, and worsening gradually. The patient had a known history of alcohol abuse and human immunodeficiency vi-

rus (HIV) infection that was recently diagnosed without any antiretroviral therapy at the time of presentation.

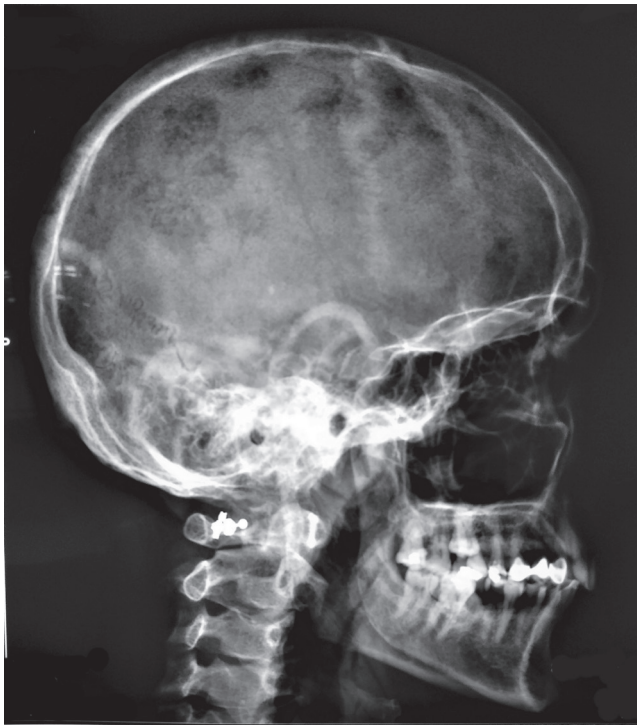
Radiograph (**Fig. 1**) and Computed Tomography (CT) of the head (**Fig. 2**) were performed.



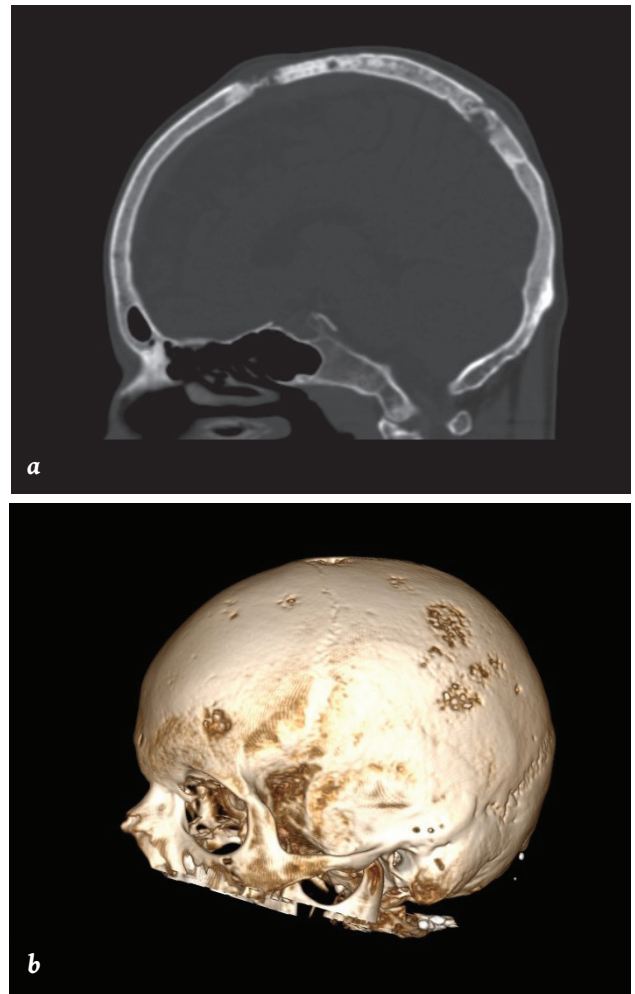
### CORRESPONDING AUTHOR, GUARANTOR

**Corresponding author:** Aspasia Polanagnostaki, Radiology Department, AHEPA University Hospital of Thessaloniki, 1 Kiriakidi Str, 54621 Thessaloniki, Greece, Email: apolanag@auth.gr

**Guarantor:** Panagiotis Prassopoulos, Radiology Department, AHEPA University Hospital of Thessaloniki, 1 Kiriakidi Str, 54621 Thessaloniki, Greece, Email: pprasopo@auth.gr



**Fig. 1.** Radiograph of the skull (lateral view).



**Fig 2.** CT of the head. **a.** bone window, **b.** 3D reconstruction.

---

## PART B

---

### **Diagnosis: Syphilitic skull osteomyelitis**

Lytic lesions of the skull (**Figs. 1, 2**) may be related to a wide spectrum of diseases. However, the spectrum narrows down to a limited number of options after a systematic approach based on the multiplicity of lesions, thorough analysis of imaging characteristics, clinical profile and laboratory findings. In middle aged patients with multiple vault lesions the differential diagnosis primarily includes metastasis, multiple myeloma and lymphoma [1].

In the clinical setting of history of human immunodeficiency virus (HIV) infection, our patient underwent specific blood tests for the range of sexually transmitted diseases (STDs). Venereal disease research laboratory (VDRL) test, as well as rapid plasma regain (RPR) tests came out positive and IgG/IgM syphilitic antibodies were detected.

Bone biopsy was performed, which excluded metastasis and lymphoma and confirmed the diagnosis of early syphilis with calvarian osteomyelitis. Proper antibiotic therapy was initiated, including benzathine penicillin G 2.4 millionunits intramuscularly, three doses in total, each at one-week intervals. Follow up radiograph (**Fig. 3**) revealed progressive healing of the calvarian lesions.

Syphilitic infection may occur in four stages regarding clinical manifestations. Chancre characterises the primary stage, while lymphadenopathy and bacteraemia are the hallmarks of the secondary stage. Latent stage may exhibit only positive reactive serologic tests, while tertiary affects the vascular, nervous and skeletal systems [2-4].

Syphilitic osteomyelitis is an unusual manifestation of early acquired syphilis [2]. On the contrary, bones are characteristically affected in the tertiary stage of the disease and in congenital infection [3]. Early-acquired syphilis can affect various bones, including the skull, clavicle, tibia, humerus, ulna, or radius [2]. However, the skull was the only osseous site that was involved in our patient and there were no symptoms indicative of the disease elsewhere in his body. The degree of bone response to spirochete infection depends on the organism virulence, host inflammatory response, and the specific region of bone involved (periosteum, cortex or medullary cavity). In the secondary stage of syphilis, spirochetaemia leads to in-

fection and involvement of the deeper vascular areas of the periosteum, with production of perivascular inflammatory infiltrates and highly cellular granulation tissue. The inflammation extends into the Haversian canals, causing osteitis and osteomyelitis [4].

It is challenging to differentiate syphilitic osteomyelitis from other radiolucent lesions of the skull on imaging [2]. Syphilis is a great imitator and its appearance may simulate other far more frequent diseases [5]. Lytic lesions of the skull include a spectrum of diseases, varying from benign conditions such as dermoid/epidermoid cysts, intraosseous haemangioma, desmoplastic fibroma and aneurysmal bone cysts to malignant lesions such as lymphomas or metastases, that are highly suspected when the lesions multiple [1]. Since clinical presentation is non-specific, diagnosis of syphilitic osteomyelitis can be passed over in the context of lacking other syphilis-indicative findings, such as lymphadenopathy or mucocutaneous findings [4]. Skull lesions are often painful; however, headache is a common symptom of central nervous system involvement due to meningitis and, therefore, not specific for skull lesions [6].

After a gradual decrease of syphilis between 1990 and 2000, the trend for primary and secondary syphilis has now reversed [4]. Under the light of this revival, there is a high probability of early syphilitic osteitis and osteomyelitis to become more common presentations in the future, especially in HIV-immunocompromised patients in whom the disease has a higher prevalence [7] and more aggressive clinical presentation [4]. Notably, there are no treatment guidelines for syphilis with bone lesions at present; however, high-dose penicillin therapy has proven to be beneficial according to the literature [8].

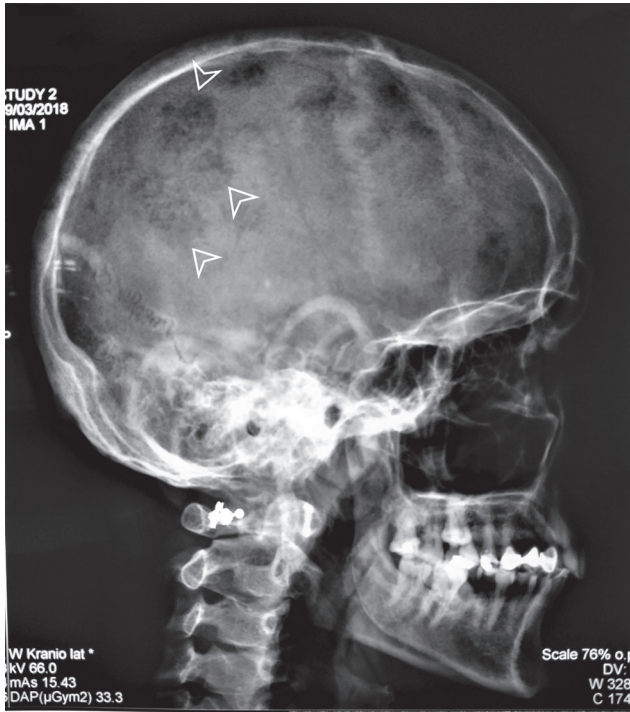
This case points out that radiologists should include syphilis in the differential diagnosis of lytic calvarian lesions, especially in immunocompromised patients. **R**

### **Funding**

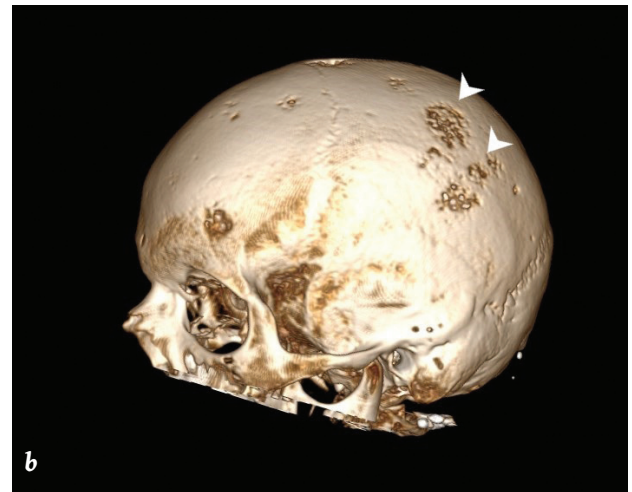
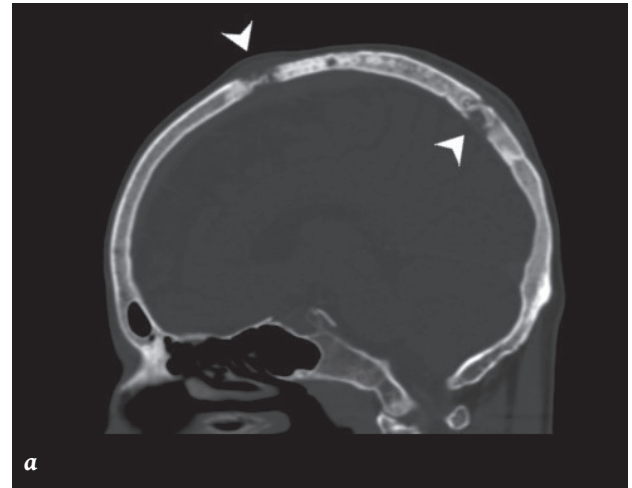
*This project did not receive any specific funding.*

### **Conflict of interest**

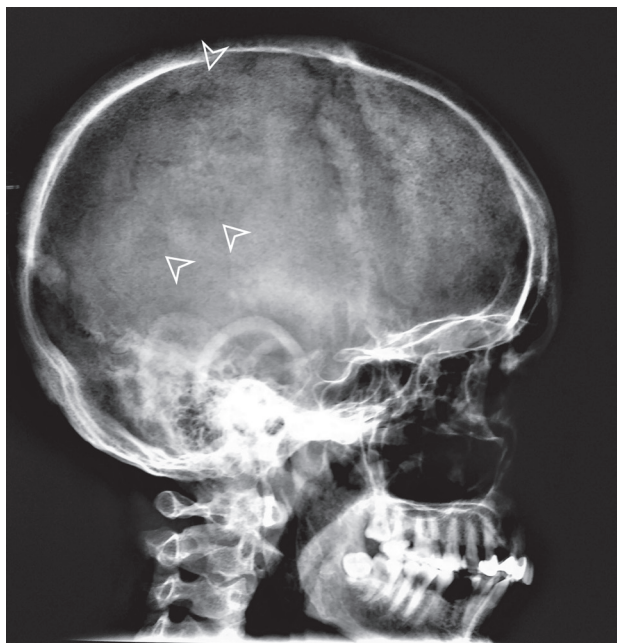
*The authors declared no conflicts of interest.*



**Fig. 1.** Radiograph of the skull (lateral view). Multiple radiolucent lesions are noted in the frontal and parietal bone (arrows).



**Fig 2.** CT of the head. **a.** bone window, **b.** 3D reconstruction. Osteolytic skull lesions due to syphilitic osteomyelitis (arrows) are evident.



**Fig. 3.** Follow up radiograph of the skull. Progressive healing of radiolucent lesions (arrows) is present.



## KEY WORDS

X-ray; Computed tomography; Skull/lytic lesions; Syphilis/bone involvement

## REFERENCES

1. Pons Escoda A, Naval Baudin P, Mora P, et al. Imaging of skull vault tumors in adults. *Insights Imaging* 2020; 11: 23.
2. Kang SH, Park SW, Kwon KY, et al. A solitary skull lesion of syphilitic osteomyelitis. *J Korean Neurosurg Soc* 2010; 48: 85-87.
3. Herrera-Herrera I, Escalona-Huerta C, Valle-Zapico JD, et al. Secondary syphilis with bone involvement of the skull: A case report. *OMICS J Radiol* 2017; 6: 265.
4. Huang I, Leach JL, Fichtenbaum CJ, et al. Osteomyelitis of the skull in early-acquired syphilis: Evaluation by MR Imaging and CT. *AJNR Am J Neuroradiol* 2007; 28(2): 307-308.
5. King AJ, Catterall Rd. Syphilis of bones. *Br J Vener Dis* 1959; 35: 116-128.
6. Hansen K, Hvid-Jacobsen K, Lindewald H, et al. Bone lesions in early syphilis detected by bone scintigraphy. *Br J Vener Dis* 1984; 60: 265-268.
7. Elope L, Morell V, Bosshurdt C, et al. A case of syphilitic osteitis in a patient with HIV infection. *Int J STD AIDS* 2014; 25(10): 765-767.
8. Kusler J, Arturs S. Rare case of four osseous lesions of the skull in a patient with secondary syphilis. *Case Rep Infect Dis* 2018; 2018:3148758.



## READY - MADE CITATION

Polanagnostaki A, Chrysanthidis T, Prassopoulos P. Lytic skull lesions in a middle-aged man. *Hell J Radiol* 2021; 6(2): 62-66.