

Lesions and Malignant Deformations in 13-16 Century Hungarian Osteoarchaeological Samples

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ABSTRACT:

Anthropological, paleopathological investigations were performed on 89 skeletal remains found in 13-16 century tombs in the courtyard of the 13th century Dominican monastery in Vasvár in Hungary (Europe). Several osteoarchaeological samples showed lesions and malignant deformations as clear signs of ancient diseases such as syphilis, multiple myeloma and osteosarcoma.

Key words: osteoarchaeology, paleopathology, syphilis, multiple myeloma, osteosarcoma.

INTRODUCTION

Archeological excavations were performed in the inner courtyard of the Dominican monastery in Vasvár (Hungary, Europe) by the staff of Museum of Savaria (Szombathely) in 2009. Next to the other archeological monuments 89 coffin-style burial sites were discovered and dated to the 13-16th Century. Skeletal remains of man, women and children were found, thus a secular cemetery operated in the courtyard (PAP 2010). The anthropological study followed the methodological recommendations of Rainer KNUßMANN (1988). Life expectancy at birth was only 22.9 years, partially because of high child mortality. Based on statistical comparisons the investigated samples were only loosely related to the anthropological records of other Hungarian archeological sites; residents of Vasvár in the Middle Ages were closer to the ethnic groups in Austria and Germany. This relationship was also observed in connection with trade, military movements and colonization. Paleopathological investigations revealed a particularly high incidence of bone injuries. In

addition to limb fractures the incidence of survived and death-causing skull injuries was also high. With the introduction of new war tactics, the close combat, the number of skulls and skeletal bones with traces of sword and saber cuts became significantly higher in this period (Toth 2012). In this summary we are reporting the incidence of bone lesions and malignant deformations which were the results of ancient diseases.

MATERIALS AND METHODS

Anthropological paleopathological (ORTNER and PUTSCHAR 1981) investigations revealed lesions and malignant bone deformations in osteoarchaeological samples from three tombs. Besides the standard macroscopic observations, radiological examination was also performed (Markusovszky University Hospital, Szombathely).

RESULTS

9. tomb: Fragmented skull and incomplete (from the waistline up) fragmented skeletal bones of a 50-60-year-old man. Lytic lesions starting from the inner side of the frontal and parietal bones, resulting in the complete puncture of the skull at two sites, indicating a malignant disease process, multiple myeloma (Fig. 1). Healed (with thickening and minimal axis deviation) fracture at the border of the upper and middle thirds of the left ulna showing the signs of the typical damage from a defensive arm posture. X-ray images of the skull showed a variable bone structure of the pyramids; alternate cystic and sclerotic areas could be observed clearly referring to osteonecrosis and reactive bone neoformation. Lytic lesions at multiple locations could be identified on the base of the skull which are most likely of tumor origin (Fig. 2-3).



Fig. 1: Lytic lesions on the inner surface of the skull

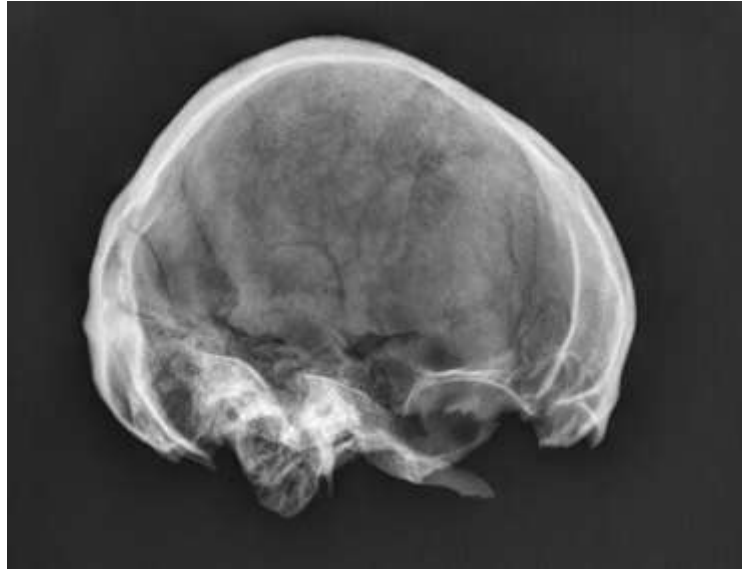


Fig. 2: X-ray image of the skull



Fig. 3: X-ray image of the skull

14. tomb: Fragmented and incomplete skull, vertebrae and upper limbs of a 40-50-year-old woman. Pacchioni pits on the inner surface of the skull. Minimal boundary formation on the lumbar vertebrae. Cancerous bone deformations - malignant bone neoformation at the elbow of the left ulna at the site of the olecranon – with no signs of lesions on the humerus (Fig. 4.). X-ray image of the left ulna showed a thickening of the cortex which had a woolly or filamentous structure at the proximal end. The part facing to the surface of the joint displayed an uneven polycystic structure which indicated a post-cancer state (Fig. 5-6).



Fig. 4: Osteosarcoma on the ulna



Fig. 5: X-ray image of the ulna



Fig. 6: X-ray image of the ulna

59. tomb: Fragmented skull and skeletal bones of a 35-45-year-old woman. 12 x 16 mm drop shaped depression on the outer surface of the left tuber frontale, which did not cause defects on the inner surface. The lesion looked like as an already healed injury, but based on a more careful investigation it proved to be a caries sicca surrounded by groups of small ditches (pitting) caused by a specific infectious disease. In relation to this the spongy bone in all limbs (on both sides the femur, tibia, fibula, humerus, ulna and radius) were completely remodeled, the spongiosa showed a woolly structure, the cortex was thickened. The thickening was typically roughly striated and accompanied by surface cavitation (Fig. 7). The vertebrae were not involved. The described characteristic bone lesions and deformations of the skull and the limbs are in good agreement with the conditions in the third stage of syphilis (MARCSIK et al. 2009). Other deformations on the humerus, caused by increased physical stress, were also observed. On X-ray images the cortex of the diaphysis of the tibia showed a fibrous structure, the medullary space significantly narrowed, was sclerotic. The distal cortex exhibited a few cm long uzuration corresponding to a post inflammation process (Fig. 8-9).



Fig. 7: Lesions caused by syphilis on the tibia

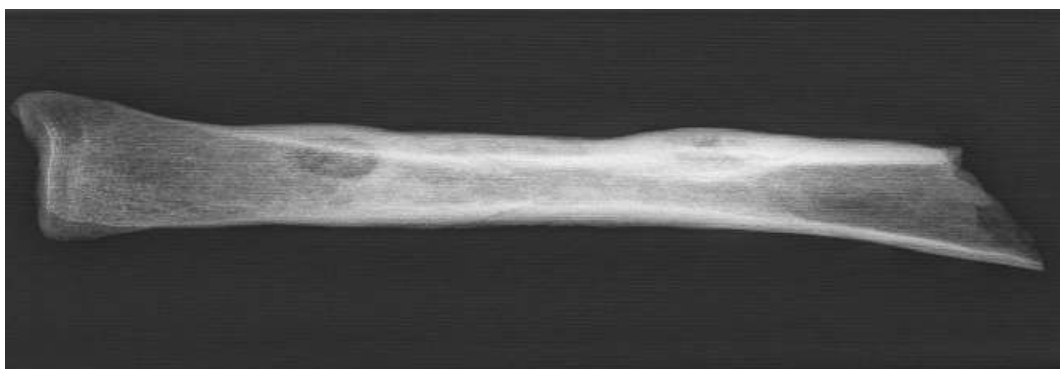


Fig. 8: X-ray image of the tibia

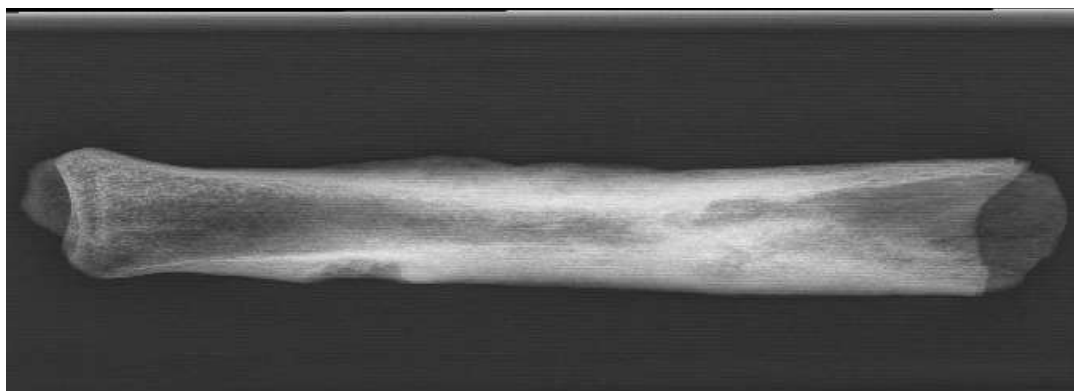


Fig. 9: X-ray image of the tibia

DISCUSSION

Identification of malignant bone tumors are relatively rare in historical materials in Hungary (MARCSIK et al. 2001, JÓZSA and FÓTHI 2002, JÓZSA 2006, TÓTH et al. 2008, MOLNÁR et al. 2009, BONA et al. 2014, MERCZI et al. 2014). Based on the clinical indicators we could conclude that the malignant lesions on the osteoarchaeological samples found in tomb 14. was caused by osteosarcoma (its type most possible could be identified by biochemical tests).

Another malignant carcinoma, bone marrow plasma cell tumor (multiple myeloma) was identified on the samples from the 9th tomb. This type of disease is more common in those over 50 years (JÓZSA 2006), thus, even in the absence of differential diagnosis, the osteolytic metastasis of a malignant tumor of the internal organs can be safely excluded as the cause of the observed lesions on the skull (MOLNÁR et al. 2006)

Those infectious diseases which have a rapid course do not leave marks on the bones. So lesions indicative of infectious diseases could be observed only in the context of one disease. During the investigation of the osteoarchaeological samples from the 59th tomb the characteristic consequences of the third stage of syphilis (PAYR 1914, FORNET 1944, RATKÓCZY 1948, BALÓ 1952, MAGYAR and PETRÁNYI 1956, MARCSIK et al. 2009, TÓTH et al. 2009, BARLOVITS et al. 2010) was identified.

Although there are evidences for the sporadic occurrence of syphilis in Europe prior to Columbus, most possibly syphilis arrived in Europe as a major infectious disease through the

Spaniards, only after the discovery of Central and South America and caused a massive infection in the southern parts of France in the Fall of 1494, as well. Subsequently, Italy, and the rest of Europe also become infected (WALTER 1978, MÜLLER and WINKLER 1985, DUTOUR et al. 1994, MARMOTTANS 1994).

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