

## THE OSTEO-ARCHAEOLOGICAL EVIDENCE OF VERTEBRAL TUBERCULOSIS IN THE 8TH CENTURY

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### Abstract

A paleopathological examination of the human skeletal remains from the Avar-Age cemetery of BÉlMEGYER has been carried out. By course of the examination, the Author diagnosed a highly probable case of vertebral tuberculosis. The vertebral remains of a female skeleton produced the typical osteological features of an advanced-stage tuberculous spondylodiscitis (POTT's disease). The differential diagnosis was based on examinations using macroscopic morphological and radiological methods.

*Key words:* paleopathology, Avar Age, tuberculosis, POTT's disease.

### Introduction

Tuberculosis is a chronic infectious disease caused by different strains of *Mycobacterium tuberculosis*, (*M. bovis*, or, rarely *M. avium*) (BÉLÁDI et al., 1978). The pulmonary tuberculosis is the most common form of the disease. However, the bacilli can also be disseminated from the lung and cause disease in other parts of the body, notably in the cervical and axillary lymph nodes, in bones and joints and in the genito-urinary system (LAPIS, 1989).

Although, only about 1% of all the tuberculous cases involves the bones and joints (GOMÓR and BALINT, 1989), this represents one of the most important joint disease of inflammatory origin.

What the skeletal localisation of the lesions concerns, the four major sites of skeletal tuberculosis are: -the vertebral column, -the hips, -the knees, and -the elbows (SEZE and RYCKEWAERT, 1983).

Statistical data reveal that the spine is the most common location for tuberculosis and, because of its anatomical position and relation to the central nervous system, it is also the most serious among the locations (MARTINI, 1988). The disease starts in the spongy substance of the vertebral body and eventually the intervertebral disc becomes eroded and some adjacent vertebrae can be involved, too (PARSONS, 1980).

The first report on presumptive tuberculosis in osteo-archaeological material was published by BARTELS in 1907 (in: REGÖLY-MÉREI, 1962).

Since that, the description of vertebral tuberculosis can be found in most of the general paleopathological studies, from the early period of paleopathology up till now (MOODIE, 1923; PALES, 1930; WELLS, 1964; ZIMMERMAN and KELLEY, 1982).

### Materials and methods

A paleopathological investigation of the 234 skeletons belonging to the late Avar-Age cemetery (8th century) of BÉLMEGYER-Csömöki Hill (Eastern part of Hungary) has been carried out. The skeletons can be found in the collection of the Department of Anthropology, József Attila University. Looking for the skeletal symptoms of other diseases, a possible case of vertebral tuberculosis was detected. The present paper is a case report about the skeletal remains of the grave Nr. 65.

The aim of our study is the paleopathological diagnosis and interpretation of the detected pathological features.

The differential diagnosis was based on macromorphological and X-ray methods. The radiological analysis was carried out at the Department of Radiology of the Szeged Hospital.

### Results and Discussion

The determination of sex and age of the skeletal remains coming from the grave Nr. 65 (Finding Nr. 10047) of the BÉLMEGYER-cemetery was made by traditional methods used in historical anthropology (FARKAS, 1972; MARTIN and KNUSSMANN, 1988).

The skeleton belongs to a 30 to 40 year old female. The remains are in a medium state of preservation. The spine is rather incomplete: 4 cervical, 10 thoracic and 4 lumbar vertebrae serve for the subject of examinations.



Fig. 1. Spinal remains showing angular kyphosis.

The fragments of the thoracic spine show serious pathological deformations (Fig. 1). There is a collapse and ankylosis among the bodies of the 8th and 11th thoracic vertebrae. The anterior portion of the bodies are most seriously involved and the unequal collapse results an angular posterior deformity (kyphosis). Angular kyphosis is also clearly expressed in the lumbar spine. The first, second and third vertebrae are ankylotic. The radiograph (Fig. 2) shows serious destructions of the vertebrae. The first area of involvement extends from T-8 through T-12, the second one from L-1 through L-4. Massive destruction, collapse, and severe kyphoscoliosis are evident at T-8 to T-11. The collapsed bones also display extensive fusion of the bodies and articular processes. The fragments of the lumbar spine show similar alterations.

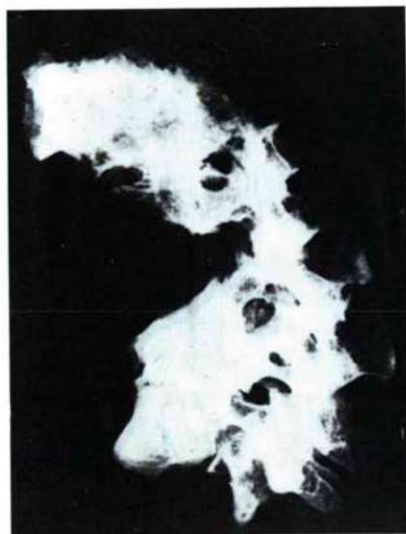


Fig. 2. Radiograph of vertebrae seen on Fig. 1. Ankylosed vertebrae.

As a result of the spondylodiscitis, the vertebral body of the second lumbar vertebra got completely destroyed. Severe destruction of the third lumbar vertebra can be seen on Fig. 3. Only T7-8, T11-12, T12-L1 and L4-L5 disc spaces remain.

No other pathologic lesions on this skeleton could be found.

As we know from the literature, the tuberculous changes of the spine are usually found in the lower thoracic and/or in the upper lumbar portion (KELLEY and EL-NAJJAR, 1980; MANCHESTER, 1983).

Developing differential diagnosis the tuberculous features should be separated from spondylitis non specifica and healed fracture (ORTNER and PUTSCHAR, 1981). In spinal osteomyelitis, the massive destruction of several vertebral bodies leading to a sharply angulated gibbus is uncommon (BODA, 1985). In compression fracture with angular deformity, usually only one vertebra is involved with a diagonal break, and there is a much less extensive destruction of the vertebral body (BARTA, 1986). In me-

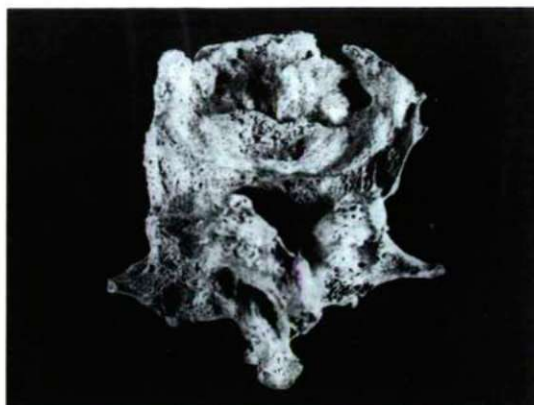


Fig. 3. Inferior view of the 3rd lumbar vertebra. Severe destruction of the vertebral body.

tastatic carcinoma the intervertebral disc is not destroyed (ENDES, 1983), consequently it can be disclosed.

The above mentioned morphological and radiological changes emphasise the occurrence of vertebral tuberculosis (HORVÁTH and FORGÁCS, 1984), but cases in which two different lesions are separated by at least one intact vertebral are not common (MARTINI, 1988).

In the BÉlmegyer-series a second possible case of tuberculosis — leading to the destruction of the hip joint of an other individual — was found too. Consequently, the frequency of joint tuberculosis is about 0,8% in the BÉlmegyer-population. This value does not differ significantly from the data of other authors concerning historical periods (GLADYKOWSKA-RZECZYCKA, 1984; KRAMAR, 1987; DUTOUR et al., 1989). What the Avar-Age cemeteries concerns (MARCSIK, 1972; FARKAS et al., 1976; MARCSIK, 1977), the prevalence of the disease recognised is usually around one percent.

In order to be able to carry out a better epidemiological analysis of the disease we must examine numerous further populations from different historic periods.

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#### References

- BARTA, O. (Ed.) (1986): Az ortopédia tankönyve. — Medicina Könyvkiadó, Budapest. 37—55.  
 BÉLÁDI, I., KÉTYI, I., NÁSZ, I. and VÁCZI, L. (1978): Orvosi mikrobiológia — immunitástan — parazitológia. — Medicina Könyvkiadó, Budapest. 200—204.

- BODA, A. (1985): Csont-ízületi gennyeseések. — Medicina Könyvkiadó, Budapest. 73—91.
- DUTOIR, O., BERATO, J., ZAKARIAN, H. and ACQUAVIVA, P. C. (1989): Contribution de la rhumatologie a la paléopathologie osseuse. — Solfanelli Editore, Chieti. 31—36.
- ENDES, P. (1983): Pathologia. — Medicina Könyvkiadó, Budapest. 2, 793—804.
- FARKAS, Gy. (Ed.) (1972): Antropológiai praktikum. I. Paleoantropológiai metodikák. — JATE, Szeged. 39—66, 123—136.
- FARKAS, Gy., MARCSIK, A. and VÉKONY, L. (1976): Vertebral deformation in the avar skeletal material. — *Anthropologie* 14, 231—233.
- GLADYKOWSKA-RZECZYCKA, J. (1984): Eight cases of probable tuberculosis from ancient Polish cemeteries. — Paleopathology Association, 5th European Meeting, Siena 1984. 129—136.
- GÖMÖR, B. and BÁLINT, G. (1989): Reumatológia. — Medicina Könyvkiadó, Budapest. 153—159.
- HORVÁTH, F. and FORGÁCS, S. (1984): Ízületi betegségek röntgendiagnosztikája. — Medicina Könyvkiadó, Budapest. 55—83.
- KELLEY, M. A. and EL-NAJJAR, M. Y. (1980): Natural Variation and Differential Diagnosis of Skeletal Changes in Tuberculosis. — *Am. J. Phys. Anthropol.* 52, 153—167.
- KRAMAR, C. (1987): Paléopathologie des maladies rhumatismales. — *Méd. et Hyg.* 45, 928—935.
- LAPIS, K. (1989): Pathologia. — Medicina Könyvkiadó, Budapest. 3, 1048—1050.
- MANCHESTER, K. (1983): The Archaeology of Disease. — University of Bradford, Bradford. 35—41.
- MARCSIK, A. (1972): Generalizált tbc megbetegedés diagnózisa egy avar kori csontvázon (Diagnose einer generalisierten TBC-Erkrankung auf einen Awarzeitlichen Skelett). — *Anthropol. Közl.* 16, 99—103.
- MARCSIK, A. (1977): Comparative evaluation of pathological avar findings from excavations between the Danube and Tisza rivers. — *Acta Biol. Szeged.* 24, 143—150.
- MARTIN, R., and KNUSSMANN, R. (1988): Anthropologie. — Gustav Fischer Verlag, Stuttgart. 421—496.
- MARTINI, M. (1988): Tuberculosis of the Bones and Joints. — Springer Verlag, Berlin. 157—197.
- MOODIE, R. L. (1923): Paleopathology. — University of Illinois Press, Urbana. 347—413.
- ORTNER, D. J. and PUTSCHAR, W. G. J. (1981): Identification of Pathological Conditions in Human Skeletal Remains. — Smithsonian Institution Press, Washington. 141—176.
- PALES, L. (1930): Paléopathologie et pathologie comparative. — Masson & Cie, Paris. 226—246.
- PARSONS, V. (1980): A Colour Atlas of Bone Disease. — Wolfe Medical Publications Ltd, London. 98—104.
- REGÖLY-MÉREI, Gy. (1962): Az ősemeri és későbbi emberi maradványok rendszeres kórbonctana. — Medicina Könyvkiadó, Budapest. 175—191.
- SEZE, S. and RYCKEWAERT, A. (1983): Maladie des os et des articulations. — Flammarion, Paris. 3, 810—841.
- WELLS, C. (1964): Bones, bodies and disease. — Thames and Hudson, London. 76—115.
- ZIMMERMAN, M. C. and KELLEY, M. A. (1982): Atlas of Human Paleopathology. — Praeger Publishers, New York. 91—107.