Osteochondroma in a Skeleton from an 11th Century Croatian Cemetery

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We present a case of a well-preserved bone tumor in a skeleton from a Croatian skeletal series dated to the 11th century AD. The tumor is located on the anterior side of the neck of the right femur. The gross morphology of the tumor—a round, lumpy, cauliflower-like appearance with a fairly smooth external surface—is consistent with osteochondroma. The diagnosis is supported by x-ray and CAT-scan findings, which show thickened trabeculae and an inter nal structure of cancellous bone interspersed with areas of dense compact bone. Comparison with x-rays from a patient surgically treated in 1999 for an osteochondroma with the same localization shows that the characteristics of the tumor have remained unchanged from the 11th century.

Key words: chondrosteoma; Croatia; history of medicine, medieval; osteochondroma; paleopathology

Re search in the paleopathology of human tumors is problematic for a number of reasons. First, there is the initial problem of deciding which osseous changes should be classified as tumors. For instance, whether the abnormal bone growth, which is the result of a trauma such as myositis ossificans, is a tumor? Should bone changes caused by soft tissue tumors pressing on bone and producing des sions be classified as tumors? The second problem is classifying neoplasms as either benign or malignant. Some initially benign tumors can become malignant with time. A further complicating factor arises from the fact that ancient skeletal material is frequently poorly preserved. Evidence of bone disease by osteolytic tumors can be obscured by post mortem changes. Diagnoses from well-preserved cases can also be uncertain because of se oseous changes caused by different conditions. For example, the de structive lesions of metastatic ovarian cancer and melanoma can be indistinguishable. Numerous researchers have commented on these problems and the need for thorough and careful analysis of the results. Methods, including x-rays and CAT-scans, are essential for proper diagnosis. So far, tumors have been reported in several skeletal series from different parts of the world—Peru (1), the USA (2), Egypt (1), England (3), France (4), and Switzerland (3). In Central Europe, tumors have been reported in archaeological skeletal populations from Poland, the Czech Republic, and Slovakia (5,6). This paper presents a case of a bone tumor in an archaeological population from 11th century Croatia.

Case Report

In 1998, the Department of Archaeology of the University of Zagreb began rescuing archaeological excavations at the site of Lobor. Lobor is located in the Croatian Zagorje, an area in northern Croatia close to Croatia’s border with Slovenia. The site was previously noted in Croatian archaeological literature as the second medieval site in continental Croatia (the first is in Sisak) with pre-scientific discoveries in the laced stone plats with fragments that were part of the inventory of a Pre-Romanesque church (7). During the course of excavation, the cemetery was uncovered and a total of 13 graves were excavated. Based on burial ritual and finds from the graves—mostly bronze or iron S-links, cast-metal rings, and silver coins, use of the cemetery was dated to the first half of the 11th century and the Bjelobrdo culture (8). Bjelobrdo culture, named after the eponymous site near Osijek in eastern Croatia, flourished in the central part of the 11th century and the 12th century. The case reported in this paper was found in a grave number 6. Grave 6 was a single primary inhumation containing the remains of a single adult male. Bone preservation of the skeleton was excellent with only several small bones from the wrist area missing. Based on pelvis and cranial features, the individual was clearly male. We tried to estimate the age at death by using as many methods as possible, including ectocranial suture fusion (11), pubic symphysis morphology (12-14), auricular surface morphology (15), and sternal rib end changes.
19-year-old female patient, surgically treated at the Department of Orthopedic Surgery, University of Zagreb in 1999, had an almost identical osteochondroma on the left proximal femur. After complaining of symptoms which included tenerness and painful sensations in the left hip, as well as some loss of hip movement, the patient was admitted to the Department of Orthopedic Surgery, where a radio logical picture (Fig. 6) revealed a large, fairly round tumor located intertrochanterically. The tumor had a wide base with a smooth and rounded outer surface. The internal structure of the tumor was identified as cancellous bone interspersed with compact bone. Clinical examinations showed normal hip movement except for painful full terminal rotation.

Discussion

Tu mors are rarely reported in archaeological skeletal material. This is the first case noted in a proximal malleolar osteochondroma on the left in a male patient. The patient, who was born in 1999, had an almost identical osteochondroma on the left proximal femur. After complaining of symptoms which included tenerness and painful sensations in the left hip, as well as some loss of hip movement, the patient was admitted to the Department of Orthopedic Surgery, where a radio logical picture (Fig. 6) revealed a large, fairly round tumor located intertrochanterically. The tumor had a wide base with a smooth and rounded outer surface. The internal structure of the tumor was identified as cancellous bone interspersed with compact bone. Clinical examinations showed normal hip movement except for painful full terminal rotation.

The well-preserved tumor was located on the anterior side of the neck of the right femur (Fig. 1). The surface of the tumor was irregular with a rounded, lumpy, cauliflower-like appearance. Its mean shape was broad and extended from the proximal area of the femoral neck to the proximal femur. After complaining of symptoms which included tenerness and painful sensations in the left hip, as well as some loss of hip movement, the patient was admitted to the Department of Orthopedic Surgery, where a radio logical picture (Fig. 6) revealed a large, fairly round tumor located intertrochanterically. The tumor had a wide base with a smooth and rounded outer surface. The internal structure of the tumor was identified as cancellous bone interspersed with compact bone. Clinical examinations showed normal hip movement except for painful full terminal rotation.

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The mean age at death in the skeletal series from the medieval Stenjevac cemetery, which is approximately 35 km southwest of Lobor and dated to the same time period, was 25.0±15.8 years (20). In three other medieval cemeteries, slightly farther from Lobor but still in continental Croatia (Stari Jankovci, Privlaka, and Nova Rača), the mean age at death was 33.7±17.6 years, 28.0±14.4 years, and 22.3±14.9 years, respectively (20,21). People who lived in those communities had little chance of developing secondary bone tumors resulting from metastases of soft tissue tumors, such as breast, prostate, kidney, or thyroid tumors, as these are associated with the older age groups. On the other hand, primary cancer arising from the cellular bone constituents (sarcoma) is not frequent at all today, and based on the worldwide paucity of diagnosed cases in ancient skeletons (1-3,5), appears to be similarly uncommon in antiquity.

Benign bone tumors are common today but, since asymptomatic, many remain unrecognized during life unless discovered accidentally. In skeletons with soft tissue, these tumors are easily recognized, so their frequency in skeletal populations seems increased.

As tumors are rarely diagnosed in archaeological series, every new case of neoplasm enriches our knowledge on their specificity, characteristics, location, and frequency. Comparison of gross morphology and the x-ray and CAT-scan pictures of the case from Lobor with a recent osteochondroma showed that the characteristics...
of this common bone tumor remained unchanged for over 9 centuries.

While it would be tempting to speculate on the effects the tumor had had on the quality of life of the individual recovered from the grave 6 in Lobor, the absence of soft tissues makes this inappropriate. The skeletal data does, however, indicate that there is no evidence of a malignant transformation of the tumor. The age at death slightly higher than average can also be interpreted as evidence that the tumor did not affect the life span of this individual.

Acknowledgments

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