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ARTERIOSCLEROSIS IN EGYPTIAN MUMMIES

INTRODUCTION

Arteriosclerosis in mummies attracted much attention in surveys on pathology in Ancient Egypt (Gray 1960, 1967; Long 1931; Moodie 1931; Sandison 1963; Smith and Dawson 1924; Ruffer 1911, 1921). In his histological studies, Sandison (1967) drew attention to the fact that arteriosclerosis appeared in Ancient Egyptians at a relatively young age; this observation led him to conclude that finding arteriosclerosis in an Egyptian mummy is not a definite sign of advanced age. Nevertheless, arteriosclerosis in mummies has usually been found in senile subjects. For example, this disease was widespread in the well-known mummy of Merenphtah, who is supposed to have been the Pharaoh of the Exodus and to have died at the age of 80 years (Barry 1969; Henschen 1966; Shattock 1909; Smith and Dawson 1924).

MATERIAL

During our systematic X-ray study of all Egyptian mummies in different Czechoslovak collections, we have found signs of arteriosclerosis in 3 out of 21 intact adult mummies. Two of the mummies with arteriosclerosis are especially interesting, although for different reasons.

Case 1. A mummy of an adult woman who died at the age of 50—70 years. The body is unwrapped, the arms stretched out along the body. According to the embalming technique the mummy can be dated to the 3rd intermediary period (1087—664 B.C.). The origin of the mummy remains unknown; the only certainty is that this mummy belonged to the Czech Museum in Prague from the beginning of the last century. The mummy is now kept in the Náprstek Museum in Prague (No. P 634). Nevertheless, this is the mummy on which the first scientific autopsy and histological examination was performed; it was reported by J. N. Czermak (1852), lecturer in Purkyně's Physiological Institute in Prague. In his paper Czermak stated that the thoracic aorta had escaped the embalmer and was preserved in its normal position. The aorta had been cut near the heart. His histological studies revealed calcification in the ventral wall of the ascending aorta and in the aortic arch.

This finding is completed by our X-ray examination, which confirms the presence of arteriosclerotic changes in the peripheral arteries of this mummy. The radiographs revealed spotted and mainly ring-shaped calcification in the course of both femoral arteries. The lumen of the vessels seems to be intact and not encroached upon by the calcification process *(Fig. 1).* These radiodiagnostic sings correspond to the finding in Mönckeberg's medial sclerosis; in our opinion this etiology of found changes may be held for highly probable.

Case 2. The mummy of Qenamun, the Seal Bearer of King Amenophis II (1450—1425 B.C.). This mummy is at the Castle Museum at Kynžvart (West Bohemia; No. 3328/5376). It was brought there in 1825 as a gift from Muhammad Ali to the Austrian Chancellor Metternich. X-ray examination revealed generalized osteoporosis with frequent partial collapse of the lumbar vertebral bodies and localized thinning of the parietal bones; these findings suggest an age above 60 years, which accords with historical evidence that Qenamun died at an advanced age. X-ray examination shows further a typical pertrochanteric fracture of the left femur (Strouhal and Vyhnánek 1974).

As in Case 1 the femoral artery was distinctly calcified on both sides. Arterial calcification can also be seen in the left anterior tibial artery. The radiographs reveal some calcification rings as in Case 1, but the lumen of the arteries is focally stenosed.

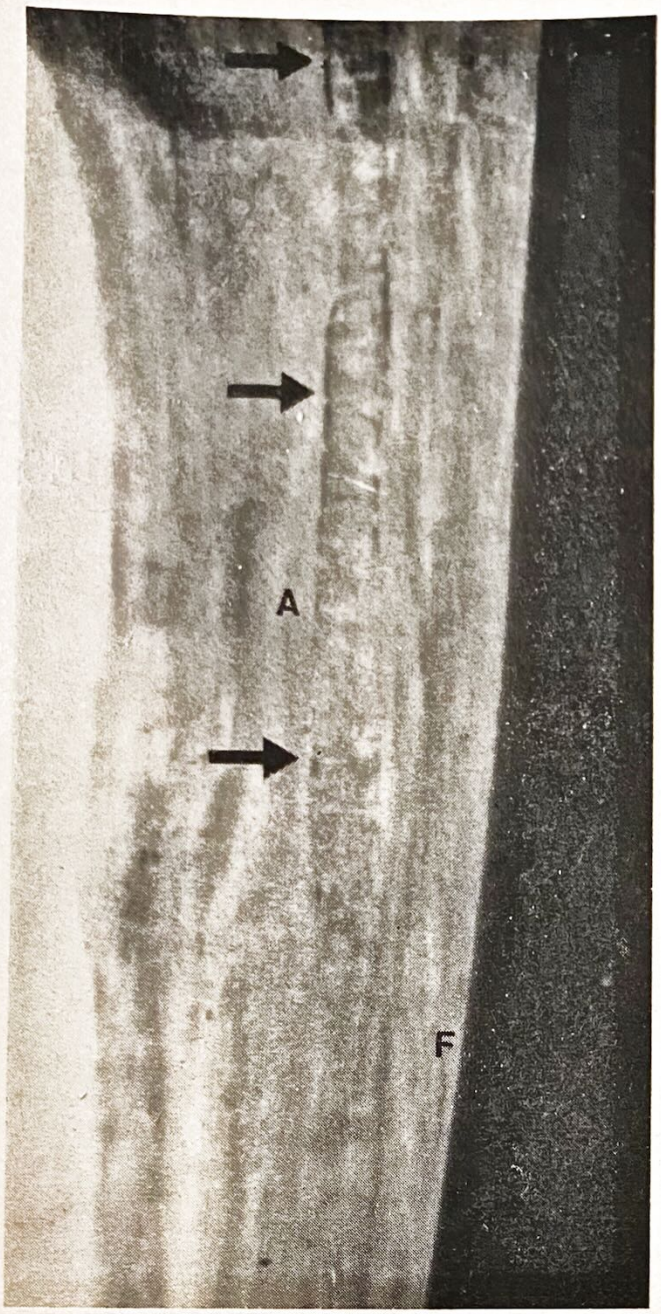

FIG. 1. *Case 1. Woman, 50—70 years. Ring-shaped calcification of the femoral artery (medial sclerosis?). A = left femoral artery, F = left femur.*

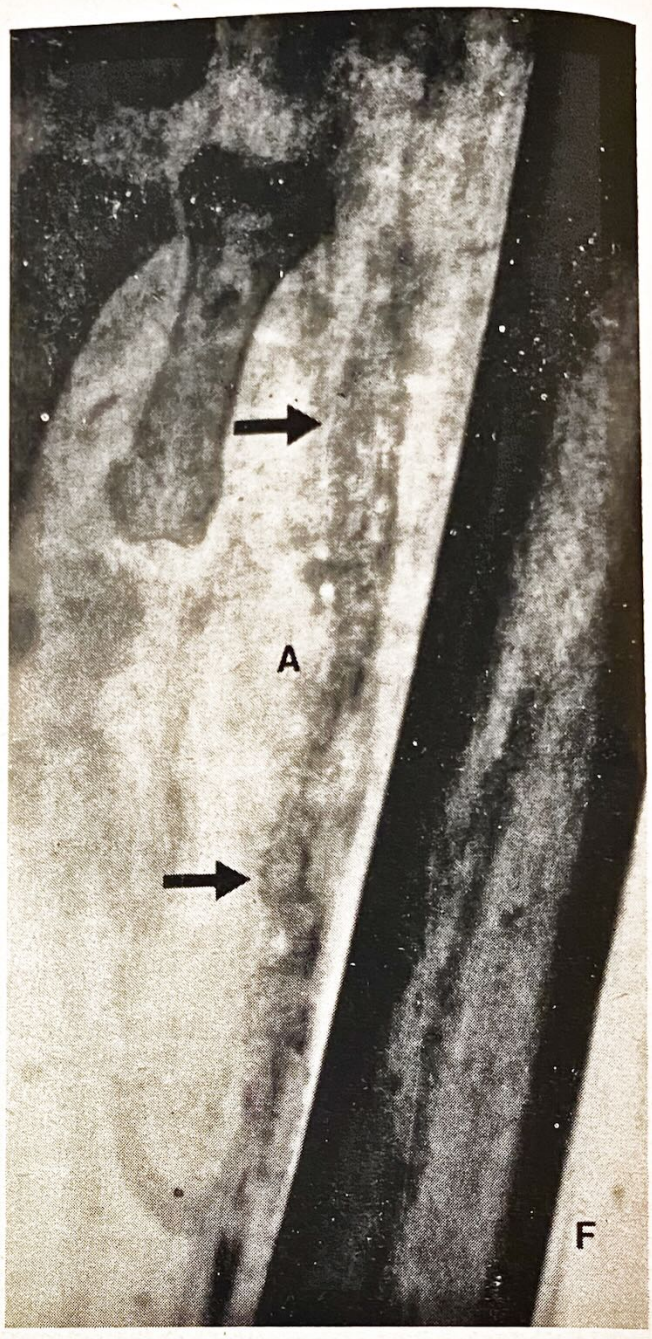

FIG. 2. *Case 2. Man, senilis, Spotted calcification with deformity of the arterial lumen (intimal disease?). A = left femoral artery, F = left femur.*

TABLE I *Frequency of calcific arteriosclerosis analyzed by age and sex in mummies from Czechoslovak collections*

Age	Men		Women		Both sexes	
	No. of mummies	Cases with arteriosclerosis	No. of mummies	Cases with arteriosclerosis	No. of mummies	Cases with arteriosclerosis
15—30 years	3	—	4	—	7	—
30—50 years	6	—	3	—	9	—
50—70 years	2	1 = 50.0%	3	2 = 66.6%	5	3 = 60.0%
Total	11	1 = 9.1%	10	2 = 20.0%	21	3 = 14.3%

This suggests that also atherosclerosis (intimal disease) was present in this case *(Fig. 2)*.

Case 3. The mummy of a woman, who died at the age of 50—70 years (Náprstek Museum, Prague, No. P 624 b). According to the embalming technique she probably lived during the Saitic or Late period (664—332 B.C.). The wall of the right femoral artery is calcified; the calcification is partly covered by the shadow of the right hand; nevertheless, the full course of this artery can be reconstructed in the radiographs. The type of the calcification is similar as in Case 2. The deformity of the arterial lumen is evident, the calcification is spotted, almost without calcified rings. As well as in Case 2, intimal disease can be supposed.

DISCUSSION

Interpretation of X-ray findings in mummified soft tissues is always influenced by the possibility of pseudopathological findings. There is the theoretical possibility with calcified arteries that an electron-dense material was absorbed during embalming. Nevertheless, histological examination confirmed the presence of calcification process in our first case and enables us to interpret such calcification shadows in radiographs as pathological.

The general frequency of arteriosclerosis in Ancient Egypt cannot be accurately determined by examining mummies. It is necessary to emphasize that X-rays would not disclose the presence of non-calcific arteriosclerosis. Only the richer classes, with their higher standard of living, would have been able to afford to embalm their dead relatives. Furthermore, arterioclerosis has been assessed in relatively few mummies, and even less so in those who died in old age.

Table 1 shows the incidence of calcific arteriosclerosis, analyzed by age and sex, in Egyptian mummies from Czechoslovak collections.

CONCLUSIONS

Our examination of Egyptian mummies confirms the view that calcific arteriosclerosis wasn't infrequent in the members of the upper classes of ancient populations, especially in old age. Non-destructive X-ray investigation of mummified bodies is the only way to gain anthropological and palaeopathological information without damaging these valuable assets of museum collections.

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