Meningeal Preservation in a Child Mummy from Ancient Egypt

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Key words
- Child
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Over many centuries, the ancient Egyptians developed a method of preserving bodies so they would remain lifelike. Mummification of bodies was originally a natural process in Egypt, and it evolved to a sophisticated embalming system to preserve the individual for the afterlife. Afterwards, mummification continued to be practiced in Egypt for some 3000 years, lasting until the end of the Christian era. In the Coptic necropolis of Qarara (Middle Egypt), 17 mummified individuals were studied during the 2012 campaign. One of them was a 6–8 old-year male child with a damaged skull that allowed us to see the meningeal structures covering the entire cranial vault, in absence of brain remains. This finding in a child mummy is exceptional, as reflected in the specialized literature.

INTRODUCTION

Death and afterlife had particular significance and meaning for the ancient Egyptians. At first, they buried their dead in small pits in the dessert. The hot and dry sand of the desert dehydrated the bodies, creating natural mummies. Over many centuries, ancient Egyptians developed methods of mummification, which varied over time and with the social status of the individuals. The process included embalming the bodies and wrapping them in strips of linen.

Natural mummies appeared in Egypt in the Predynastic Era (around 3800 BC) and remained throughout its history until the Christian Epoch or the Initial Coptic Period (3rd to 9th century AD). After the Roman Period, during the last phase of classical Egyptian history, the Copts (first Christians) buried their dead in sites where natural mummification by desiccation usually took place, even though some of the bodies were surrounded by vegetable and mineral substances that aided the preservation process.[1]

Natural mummification occurs in favorable soils and climates, particularly dry, arid areas, such as the Sahara Desert in Egypt. These condition are influenced to a large extent by the low humidity of the environment and the chemical composition of the soil, as well as the presence of circulating air. The preservation of these mummies is extraordinary in some cases, with internal organs being preserved.

CASE STUDY

Seventeen mummified individuals, in different states of preservation, were studied during the archeological campaign of 2012, carried out by the Egyptian Museum of Barcelona (Spain) together with the Eberhard Karls University of Tübingen (Germany), since 2006 in the Qarara Copt necropolis in Middle Egypt, approximately 180 km south of Cairo, on the east bank of Nile (Figure 1). One of the mummies, located in sector Q119-2, was a 6–8-year-old male child. The individual was dated from the Initial Copt Period by the type of bandages and associated funerary objects.

The presence of a postmortem fracture in the right hemicranium enabled a direct view of some preserved structures compatible with meninges (Figure 2). This thin and fragile layer covered the entire cranial vault, although it was slightly detached. The presence of the brain or other central nervous system structures inside the skull could not be determined. We also noted remains of soft tissues in the head and face, such as skin and left facial muscles, the eyelids of both eyes, and remains of hair and eyebrows (Figure 3). The meningeal surface showed the traces of vascular structures (Figure 4).

The detailed analysis of the remains of the individual did not allow a precise determination of cause of death. In Ancient Egypt, there was a high infant mortality rate because of diarrhea and infectious diseases, none of which leave evidence on the skeleton.

DISCUSSION

Although the presence of brain remains in mummies is not uncommon, the preservation of meningeal structures is infrequent in mummies. Meningeal remains have been reported in many artificial or anthropological mummies, even in those undergoing partial or total extraction of the brain through a hole made in the cribriform plate of the ethmoid and vomer bone, and later superseded with preservative substances. However, in most of these cases, meninges were differentiated from the cerebral mass located in the posterior fossa of the skull by computed tomography. Until recently, the analysis by direct visualization of the meningeal structures has been exceptional, and the majority of reported cases are adults: one Korean mummy of the Joseon Dynasty (14th–15th century AD)[2]; a female

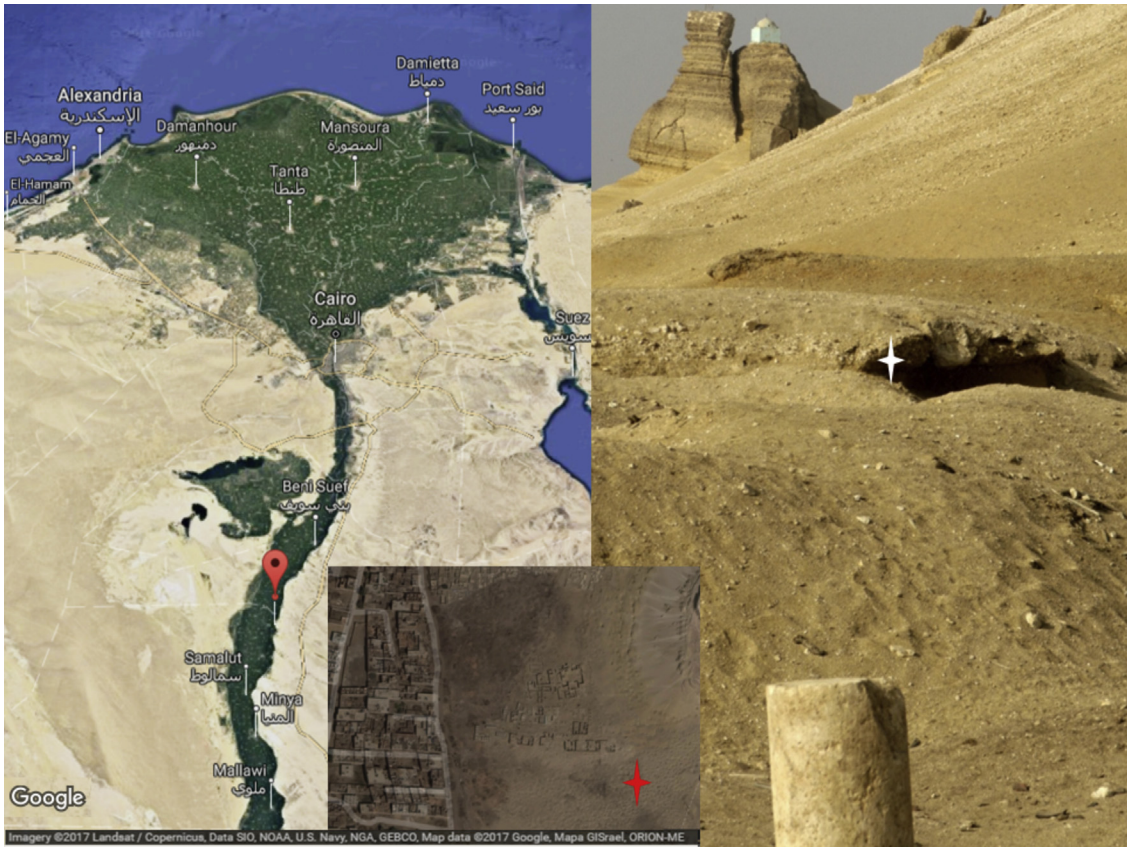

Figure 1. Map of the Lower and Middle Nile Valley in Egypt showing the situation of the archaeological area and the Coptic necropolis of Qarara (Izbat Qararah) in the detailed map of the zone. The picture corresponds to the pit where the individual was found. At the top, a modern Sheik's tomb (i.e., of the head of a Muslim religious order) is visible.

individual nicknamed Lady Mawangtui from the Han Dynasty (3rd century BC to 3rd century AD) of China[3]; several cases of pre-Columbian mummies recovered from the Atacama desert in Chile, dated between 1000 BC and AD 1500,[4] and a cerebral mass of the Ptolemaic Period in Egypt (6th to 3rd century BC) in which it was possible to see traces of the middle meningeal artery.[5] In all of them, the meninges were in direct contact with the encephalic mass, which might be different depending on characteristics in size, shape, and consistency.

The only case reported of an infant mummy with visible structures compatible with meninges is a boy of 18 months dated to the 13th century AD,[6] excavated from T.52 and T.69 tombs' group, in the pre-Roman settlement at Quimper, an archeological site in Bretagne (France).

The isolated presence of meninges, as can be seen in our mummified individual, is rare. The procedure of excerebration, in ancient times restricted to the elite, had become widespread over the centuries. The absence of brain in our child mummy, together with its presence, like a reduced and amorphous structure, in other adult individuals from the same burial site, might be due to the action of embalmers or animals. We hypothesized that environmental conditions favored the preservation of soft tissues, such as skin, muscles, and cartilages. No changes in condition were observed in the Q119-2 individual, from an initial burial to a second one, which justified a hypothetical removal of remains from this mummy.

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