Abstract Presentation Paleopathology Club Companion Society USCAP

March 3, 2013

Controversies in Egyptian Paleopathology; Who Died of What and a Bit on TT16

The studies of human remains provide us with mechanisms to understand not only the evolution of disease but in indirect way to perceive economical, environmental, ethical and many other aspects of the changes in human history. The scientific approach must be based in objective observations, careful collection of findings and intelligent analysis of well observed and measured material. Of course, the last part has the excitement of creativity and unfortunately some investigations confuse thorough analysis and clear thinking with epiphanies.

Egyptian paleopathology is not free of the biases of some studies that create not only alternative explanations or interpretations of findings, but improper analysis points our colleagues in Archeology and Egyptology in to areas that may not only be inappropriate but historically dangerous. Egyptian paleopathology has the advantage of millennial evolution and the co-existence of religious and medical texts related practices of antiquity.

Several cases will be discussed in which the official interpretation of paleopathological findings in ancient Egyptian mummies will be challenged and will give us a window of a different view of aspects of health from over 3000 years ago.

A brief presentation will be made of the personal experience in the excavation of TT16 (Thebes Tomb 16) in the last few years by the presenter.
Paleoendoscopy can be defined as the use of endoscopic techniques for studying ancient remains (usually mummies) with the aim of obtaining endoscopic images and internal samples for later processing.

Paleoendoscopic technologies use flexible instruments of very small diameter that allow exploring the anatomical cavities using natural or artificial entrances, thus obtaining extensive information with little damaging of the specimen. This technique can be combined with other technologies often used in Paleopathology. Thus, it can be very effective in the search of zones anatomically suspicious of presenting pathology in specimens studied by CT-SCAN or other imaging technologies.

Endoscopic techniques have been previously used in Paleopathology, and there are references in the paleopathologic literature of the use of otoscopes, rhinoscopes, arthroscopes laparoscopes and fibrogastroscope. Initially, they were clinically used exclusively for studying cavities with elastic walls such as the abdomen, which allow its expansion after insuflation. This led authors like Aufderheide (1) to believe that collapsed cavities do not present sufficient space for an endoscopic study. This is usually the case for the mummified abdominal cavity, but the thorax and the bony spaces of the central nervous system maintain a hollow structure after mummification which allows the study with endoscopic technologies.

Urology has a wide tradition of using rigid and flexible cystoscopes, resectoscopes and uretherorenoscopes. The latter have an extraordinarily thin diameter and allow the study and manipulation of the ureter. For this reason urologic endoscopy has experienced a great
development in the last two decades, which includes the application of digital technology and high definition imaging, making endoscopic urological instruments most suitable for the paleoendoscopic studies.

Other researchers have previously used endoscopy in mummies (see 2 for a review) and used the term “paleoscopy” (3), close to our coined “Paleoendoscopy” (4).

We are here presenting our experience using endoscopy on mummified subjects and describe the potential benefits and drawbacks of such technique. One of them is a 7-year-old member of the Castilian Royal House from the XIV century (4) and the others are different precolumbian mummies from Chiu-Chiu in Chile, currently displayed in the University of Madrid.

References:


Paleopathology of Royal Mummies in Spain
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Paleopathology's main goal is to shed light on how diseases afflicted ancient subjects and the consequences which they brought to their lives (1). Seldom, this type of studies is carried out on individual dating from thousands of years ago (2). In some cases, the importance of the subjects is such that those consequences go beyond personal life and spread through History. We here present the paleopathological findings on two such individuals, belonging to the Spanish Royal House, with different ages and historical importance but whose medical conditions could have historical relevance.

Case 1:
In September 2006 a mummified body was discovered under a small shrine of the Monastery of Santo Domingo el Mayor of Toledo, belonging to a sisterhood of dominican nuns. Historical records were reviewed which confirmed that the subject corresponded to Sancho, a bastard son of Pedro I The Cruel, King of Castilla. The body had come to the monastery in the XV century from the fortress of Toro, where it had been kept in captivity and where he died in 1370 at the age of seven. Some historians supported the theory that the subject could have died by poisoning to avoid future claims of royal rights.

External and endoscopic examinations were performed in the monastery and samples were taken from the internal organs. External examination showed that the head was almost detached from the spine and it preserved soft tissue from the left side of the face. The left arm and hand were well preserved and the latter showed a contracture similar to an ulnar claw. Endoscopic examination with a high-resolution digital flexible endoscope revealed an empty skull, presence of preserved ligaments in the vertebral channel and turgent lungs with abundant adherences to parietal pleura. The abdominal cavity showed a distorted and compact content in the lower abdomen, which could not be identified and was not biopsied, and a recognizable liver of normal external features but too hard for biopsy.
Rehydration and optical examination of the lungs demonstrated extensive anthracotic pigment and the presence of abundant intraalveolar elements consistent with hemosiderophages and inflammatory cells which, coupled with the macroscopically evident pleural sinequiae and the absence of classical poisons such as arsenic, cyanide and mercury, suggest a natural cause of death related to a pulmonary infectious process in a subject chronically exposed to smoke, probably a fireplace in his reclusion chamber (3). This possible cause of death could rule out the formerly suspected assassination by poison to avoid unexpected claims to the Castilian crown.

Case 2:

Holy Roman Emperor Charles V (also King Charles I of Spain) (Ghent 1500, Yuste 1558) was probably, in relative terms, the most powerful ruler of all times. He was the first global leader governing a conglomeration of territories in Europe, Africa, Asia and America, more extensive than those previously held by any ruler in European history. Charles V, afflicted by diversa pathologies, abdicated in 1556 and retired to the Monastery of Yuste in Cáceres. For many years, medical historians had speculated that the well documented medical condition of the Emperor during his last illness was compatible with Plasmodium falciparum malaria, and that this was the most likely cause of death. Charles V was buried in Yuste but his body was transferred to the Monastery of El Escorial in 1574. Historical reports of this transfer state that the body had spontaneously undergone mummification and that the Emperor was completely recognisable. The recent finding that the phalanx of the Emperor was kept outside the coffin allowed the investigation of the cause of his death.

The specimen consisted of part of the final phalanx of the fifth finger of one of the hands (laterality unknown). Externally, the finger fragment had a dark-brown colour and leathery consistence. The proximal part of the nail was attached to the ungual bed, whereas the outer half was completely detached. An X-ray study was performed. A 3 mm thick section of the proximal end was rehydrated by immersion in Sandison’s solution. After rehydration, the specimen was embedded in...
paraffin following standard protocols used for fresh tissues. Four \( \mu \)m sections were deparaffinized, hydrated through graded alcohols and water and routinely stained with Hematoxylin & eosin, Masson trichrome and Giemsa’s stain. The X-rays showed extensive erosion of the proximal epiphysis of the phalanx which had irregular borders and soft tissue calcifications. Macroscopic examination disclosed a yellowish deposit with chalky appearance that completely occupied the proximal edge of the specimen. At low magnification, no bone could be identified in the proximal margin of the specimen. In this location a massive deposit of weakly basophilic masses composed of fine acicular crystals eroding the bone and extending into the adjacent soft tissues was observed. Polarization and Energy Dispersive Analysis by X-rays (EDAX) demonstrated that the material corresponded to urate crystals caused by severe gout which had been historically suspected and which had impaired the emperor’s capacity as a ruler in critical moments (4).

Further histological analysis revealed a well preserved dermal collagen and bone, but no preserved cellular elements were detected except for isolated red blood cells. Giemsa’s stain showed what appeared to be young ring-form trophozoites of *Plasmodium* in some erythrocytes The size and shape of those parasites correspond to the morphology of *P. falciparum*. No mature forms with haemozoin or free malarial pigment were identified. Electron microscopy showed erythrocytes containing irregular, ill-defined structures with membrane material, consistent with intraerythrocytic parasites. Molecular analysis with PCR and sequencing confirmed the presence of this parasite in ADN extracted from the sample previously to rehydration. These results definitively confirmed the historical suspicion of malaria as the cause of death of Emperor Charles V.

We are currently studying some other members of the ancient Spanish royal houses and we expect to obtain new information which can help to understand important events in Spanish History.

References:

