Good article review about the roman giant: overgrowth syndrome in skeletal remain...

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synopsis of the content and rationale of the work

The increased attention of anthropological and archeological research towards PalePathological studies has significantly lowered the focus and examination of various skeletal samples as well as to evaluate the presence of numerous diseases that afflicted ancient populations. This papers analysis an interesting syndrome that was observed in the skeletal: Overgrowth Syndrome.

Background training of authors

Paleo Pathologists

A tall skeleton was discovered during an excavation exercise that took place in the administrative centre of Roman territorial section of Fidenae. This is a location that is approximately 7km north of Rome along the Via Salaria. The skeleton was a young male, and it was dated third Century AD. It presented a very tall, but proportionate stature which was estimated around 202cm. Notably, the long born depicted incomplete epiphysis union, as such, the stature would most likely have been taller if he would have lived longer. In this work, the differential diagnosis is analyzed. Further, the skeleton verification is characteristic of the appearance of gigantism. This is a rare growth disease that is commonly associated with different syndromes. Notably, the commonly known etiology is linked with dysfunction of the pituitary gland that results to overproduction of growth hormone (hGH) at infancy. The endocrine disorder according to Minozzi et al. (2013) stimulates cartilaginous activity at the growth plate this delays epiphyseal fusion ensuing in augmented bone length. According to Rome’s archaeological superintendence, the man’s tomb was abnormally long. The following

anthropological examination, also, indicated that the bones were also abnormally long. Subsequently, the bones were set for further analysis. Analysis was to determine that the skeleton had gigantism. Strongly, the bone and newly establish evidence of skull damage was consistent with pituitary tumor. Notably, pituitary gland is the main cause of overproduction of human growth hormone (hGH). Notably, the skeletal remains of an abnormally tall individual were discovered from a small cemetery which was dated back to the Roman imperial age was discovered in Fidenae.

The discovered extra long bones were a clear indication of a disorder that may be linked to various syndromes that result to excessive growth in many growth indicators. The commonly known etiology of excessive growth disease results from dysfunction of the pituitary gland that is the cause of overproduction of growth hormone or somatotrophic hormone. Minozzi et al. (2013) noted that a high exposure of human growth hormone produces gigantism in formative years prior to acromegaly and epiphyseal fusion in adults. Minozzi et al. (2013) also states that growth disorder can also result from the deficit in development of sexual organs before adolescence, Asin Eunuchoid Gigantism. Minozzi et al. (2013) noted that eunuchs are castrated males. Asin Eunuchoid can be characterized by disproportionate increase in the length of he lower limbs, in comparison to the upper limb.

In the skeletal remains discovered on Roman territorial section of Fidenae were attributed to a young male. The methods used to estimate the age produced incongruent results: notably, the cranial suture closure was consistent with a person between 35 to 45 years, but he dental wear suggested being between 20-30 years. Minozzi et al. (2013) indicated that an

Epiphyseal closure hardly provides steady evidence of age at death since the pathology may hay belated the fusion. In addition, the phases of epiphyseal closures depict variability and scarce uniformity between both the right and the left sides and was consistent with a 16-18 years old. Evidently, the auricular and the pubic symphysis were in agreement with those of 18-20 years old. Even though the skull was partially fragmented, it presented most normal morphology and dimensions. The thickness of the frontal and parietal bones were irregular with the thin spots and thicker parts other than the frontal internal plate that showed insignificant structure of Hyperostosis Fromtalis Interna. Notably, the external auditory exostosis of the skull was present at the right acoustic canal. This was half-occluding the exterior meatus.

The mandibular and maxillary bones were found to be massive and outstanding with teeth-to-teeth occlusion. The skull had a jaw with large mandibular condyles. The mandibles were long with an outstanding chin. Notably, the tibias' proximal epiphysis had tilted towards the midline and his resulted in genu valgun. He also had bowing legs just at the knee, with a small difference inclined tibia plate between both tibias. This relates to the non-uniformity of epiphyseal closure which produced a difference of about 10mm as observed in total lengths. Arguably, these anomalies reduced the working abilities and mobility of the individual more so in the lower limbs. The musculo-skeletal attachments of the muscle that are involved n walking depicted slight development while the slipped capital femoral epiphysis may have resulted to reduced of motion from the hip joint. Notably, the stature reconstruction led to 196. 4cm through anatomical method. Calculated by

the formulae of regression, on the basis of long limb bones the stature ranged from 199. 6-205. 9 for the tibia and femur respectively which gave an average of 202. 2 cm.

According to Minozzi et al. (2013), the tall stature that is associated with the male Hypogonadism can only result from Klinefelter syndrome that is caused by a chromosomal defect. In this regard, growth disorders can also depend on cerebral gigantism that is associated with Soto syndrome, where the circulating levels of human growth hormones are normal. Minozzi et al. (2013) noted that children n affected by Soto syndrome present an accelerated growth in the first 2 to 3 years. Tall stature and growth increase can also result from Marfan syndrome which is a genetic disease that affects the connective tissue resulting to overgrowth of the lower limb, in comparison with the upper limbs and very slim diaphyses. Arguably, the presence of giants, such as he tremendous legendary individual like he Goliath who was killed by David – has been reported often in the past by the scriptures. However, the first medical description of this disorder referred to as acromegaly was mage by Pierre Marie in 1886. This marked the commencement of the pituitary disease study.

According to Minozzi et al. (2013), the cause of gigantic acromegaly was established in the early 20th century. Minozzi et al. (2013) also notes that the interest in giant people was vastly spread in circus shows and displays of huge skeletons and skulls in the 18th century museums. Nonetheless, there are no reports about their existence in the Roman world way back the imperial age. In keeping with Minozzi et al. (2013) the only exception was the (235-238 AD) Ruler Maximinus the Thrax, who was described by literary as a

human mountain. Nonetheless, according to the image on his coinage he had an acromegalic head as so he may have been a giant. Minozzi et al. (2013) indicates that the literature of paleopathology has hardly been documented. Evidently, a polish female skeleton that was affected by the disorder and that dated 12th to 13th century AD was illustrated by Minozzi et al. (2013) as a probable case that was reported in the fifth dynasty skeleton from Giza Egypt around (2494-2345 BC).

Other common cases of acromegaly have been described by (Minozzi et al. 2013). The cases of gigantism are better explicit in the contemporary times i. e. the renowned giants published in the beginning of 20th century at a time when stature attracted the attention of the society and the doctors, as well. Minozzi et al. (2013) noted that an exhaustive description in the medical literature has often been reported where some skeletons of giants are displayed in museums although the oldest of them died just 250 years ago. In keeping with Minozzi et al. (2013) the more recent and recent cases of pituary gigantism was established in endocrinological literature. Minozzi et al. (2013) observed that the skeletal evidence is defined by growth of a disorder that may have been linked to several other disorders. Arguably, different diagnoses have been performed taking into consideration overgrowth syndrome that generates extreme growth in varied growth parameters.

Taking X-rays on young man’s skeleton exhibited conventional thick cortical bone and trabecular mass which is not characteristic of individuals with hypogonadism and Eunhnuchoid Gigantism conditions. Eunhnuchoid Gigantism is characterized by delay in puberty and epiphyseal fusion, the

upper and the lower limbs lengthen asymmetrically with, the lower limbs being longer than the upper ones. Besides, the condition results into long and tubular bones that indicate poor muscle development. Both Eunhnuchoid Gigantism and hypogonadism are responsible for bone loss in both cortical and trabecular bones. Stunted skeletal maturation, accessory epiphyses, short metacarpals, decreased skull dimensions and radio-ulnar synostosis are indicators of the presence of Klinefelter's syndrome which were not observed in young man's skeleton. Other traits not observed in the young man's skeleton include head enlargement and delay in the psychomotor development attributable to cerebral gigantism due to Soto syndrome. Remarkably, the overproduction of hGH at the adulthood outcome in acromegaly. This is a common condition compared to gigantism where the continued secretion of growth hormone after epiphyseal fusion stimulates overgrowth of the remaining perioateum and cartilage. This causes overgrowth of mandibles, intervertebral discs, facial bones, sternum, and marked periosteal bone apposition. Minozzi et al. (2013) indicated that hyperpituitarism is typically caused by a pituitary adenoma. This is a gentle tumor that can result to stimulus for hyper secretion of hGH. This results to an overgrowth with normal proportions. Minozzi et al. (2013) also indicates that the pathological characteristics observed in the skeleton were consistent with a pituitary disturbance and not any other syndrome that result to skeletal overgrowth. As such, it is impracticable to associate acromegaly with the skeleton since it presented the unfused epiphysis. Arguably, acromegaly induces overgrowth of the bone in the feet, hands mandible and periosteal apposition. All these were not observable in the

skeleton. Nonetheless, the abnormally long proportionate bones, delayed or non uniformity of epiphyseal closure together with probable sella turnica enlargement correspond with hypophyseal abnormality inception during childhood that leads to the diagnosis of hyper pituitary gigantism. Notably, several other elements like modification of the femur capitis and frontal bone support diagnosis.

Conclusion

The diagnosis done in the context of overgrowth abnormalities has proved that there is a high possibility of pituitary gigantism being responsible for the few growth variations witnessed through the case study. In a more specific perspective, it would be in order based on the diagnostics of the case study to link hypophyseal fossa and the sella turcica variations to pituitary adenoma rendering pituitary gland dysfunctional resulting into excessive production of growth hormone (hGH). The study has established that individuals who suffer from gigantism, despite being few, are at risk of dying at an early age as they are prone to suffer from chronic conditions such as heart attacks and brain disorders. To the extent that gigantism cases are rare explains reasons as to why there exists extremely limited documentation pertaining gigantism in the ancient remains of skeletons. This makes it extremely hard to establish the existence of giants in the ancient Rome but the individual forming the subject of the study provides a reference point for making a speculative proposition that giants must have aroused curiosity among the Romans. What has become clear though is that the Imperial Era was famed for having a great liking for individuals with physical abnormalities for entertainment purposes.

Bibliography

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