

CASE REPORT

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An Unusual Case of Multiple Mesosternal Foramina

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ABSTRACT: We present an unusual example of multiple mesosternal foramina (MMF). The alignment of the paired defects is unlike any previously described. Although single sternal defects are often encountered, paired defects are quite uncommon. This is the first documented example of bilateral paired defects in the sternum.

KEYWORDS: forensic science, forensic anthropology, forensic pathology, human skeletal remains, sternal foramina

Sternal foramina are described in the literature as defects that result from abnormal fusion of the ossification centers of the mesosternum (1,2). In the past, it was hypothesized that sternal fusion originated from six centers (2). However, more recent investigations have observed variable numbers of ossification sites (3). Most sources describe single defects, but a rare case of multiple mesosternal foramina (MMF) was reported by Cooper and colleagues (4). They defined MMF as paired defects positioned in a cephalic to caudal line along the midline of ossification. Additional cases of MMF have since been noted (5).

Specimen Description

An unusual pattern of multiple foramina was observed in the sternum of a 31-year-old black male during autopsy (Fig. 1). The lengths of the excised manubrium and sternal body are 60 mm and 125 mm, respectively. The width of the sternal body at the first sternebra is 33 mm, while the width at the third sternebra is more than double of that of the first, measuring 70 mm. The foramina are located caudally at the greatest width of the sternum. These bilateral defects are positioned in a transverse line, rather than a cephalic to caudal line as previously documented, with the right defect located slightly lower than the left. The left foramen measures 9 × 6 mm in diameter and the right foramen is 9 × 5 mm. Both defects have smooth edges on both their ventral and dorsal surfaces.

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Discussion

Ashley found that the frequencies of single mesosternal foramina ranged from 2.5% to 15.4%, and recent studies report frequencies of 6.7% to 7.7% in forensic samples (4,6,7). Some investigators suggest a higher prevalence of single foramina in black individuals, although no conclusive statistics are reported (7). While the incidence of MMF is unknown, it is considered to be more rare than single sternal defects.

Because defects of the sternum have no clinical significance and may not be visible in standard chest X-rays they cannot be diagnosed in vivo. However, if antemortem X-rays show evidence of abnormal fusion, their patterns could be used for positive identification (8). This is especially true for the more rare MMF. Most defects can be discerned from plastron X-rays or by transillumination of the plastron with a strong light source (9).

Conclusions

Most investigators are familiar with the commonly described single mesosternal defect. We restate that multiple defects, although less prevalent, can also occur. This case illustrates that



FIG. 1—The sternum of a 31-year-old black male with two foramina.

MMF can originate in more than one pattern. Caution should be exercised in cases involving skeletal material since mesosternal foramina could easily be misconstrued as evidence of projectile trauma by an inexperienced practitioner.

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