

ORIGINAL RESEARCH PAPER

RADIOLOGICAL AGE ESTIMATION FROM MANUBRIO-STERNAL JOINT IN LIVING POPULATION OF PUNJAB

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Abstract

Determination of age is very important in circumstances when exact date of birth is not known or is under dispute. In the developing world recording and storing date of birth was not perfect previously. Determining the age in living persons in middle aged and old people is relatively cumbersome after the eruption of third molar as the factors available for observation from which age can be determined are vague with little statistical data regionally. To overcome these shortcomings fusion of Manubrio-sternal joint is studied to find out its value in determining the age in middle and old people. Radiograph of this joint was done in 192 people with known exact date of birth with a valid proof of date of birth.

Key Words: Age determination; Manubrio-sternal Joint, Sternum, Radiological appearance

Introduction:

In India, there was no perfect way to record age previously. Many people do not have documentary evidence as a proof of their age. So, forensic experts are frequently consulted about determination of the exact age in the middle as well as old age people in civil as well as criminal cases. Whatever details available for age determination is based on the western population and that too from only dead bodies. There is little data available from Indian population. So when ever forensic experts are consulted for age determination, they usually opt for dental, skull as well as sternum radiographs in middle as well as old population. Radiographic appearance of sternum may be different from autopsy appearance of the sternum. So that data available from corpses is difficult to apply on living people for age determination and comparison. So this study was designed to get radiographic examination of lateral view of sternum from living person of Punjab whose exact age is available from birth records and note the fusion or non-fusion of Manubrio-sternal joint.

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Different workers are giving different opinion on the basis of fusion of manubrio-sternal joint [1-10] Parikh mentioned that the manubrium unites with the body in old age, at about 60 years [1].

Mathiharan and Patnaik are of the opinion that the manubrium rarely unites, except in old age [2]. Das studied ossification from sternum obtained from the cadavers during autopsy and concluded that if fusion at manubrio-corporal junction age is above 28 years, therefore, the sternal data "Manubrium fuses to the body by 60 years, is not reliable and erratic [3].

Glaister mentioned that in advanced life, the Manubrium is occasionally joined to the body by bone, although only the superficial parts of the intervening cartilage is converted into bone [4]. Jit and Bakshi studied about time of fusion of the human mesosternum with manubrium & xiphoid process in sterna obtained from 772 male and 208 female subjects from Punjab, Haryana and Chandigarh (India) varying in age from 5 to 85 years. Complete fusion of manubrium with the mesosternum was seen at 21 years or above in both sexes; though non-fusion could be seen even in a person above 60 years of the age [5,6]. Reddy and Krogmann mentioned, "The manubrium fuses with the body in old age [7, 8]. Gatzoulis et al in Gray's Anatomy edited that the Manubrio-sternal joint is usually symphysis, which ossify in old aged. In 10% of all over 30 years, the manubrium is joined to the

sternal body by bone, but the intervening cartilage may be only superficially ossified; it is in the aged that this is complete [9]. Gautam stated that the fusion of Manubrium with the body of sternum begins after the age of 40 and completed after the age 50 years [10]. The main objective of the study is to determine the range as well as mean age of fusion of Manubrio-sternal joint.

Methods:

The present study comprised of 192 subjects between the age group of 35-65 years. The cases were selected from the easily available general population to us: patients admitted in wards, their relatives and police personnel visiting the hospital, Patiala

The cases were radiologically examined for the lateral view of sternum after obtaining their written consent. Then status of fusion of Manubrium with the body of sternum was studied showing complete fusion and others (having no fusion, partial fusion and doubtful fusion).

Only those cases were selected where proof of exact date of birth was available. The cases showing any disease or damage in respect to anterior chest wall were not considered. Cases with poor quality of X-ray films due to over shadowing of the breast tissue or any other factor were discarded.

Result:

The total of 192 cases was studied. 30 cases were discarded because of lack of good x-ray exposure or breast overshadowing. The study cases were divided into age groups as follows: -

- " 35 - 40 years
- " 41 - 45 years
- " 46 - 50 years
- " 51 - 55 years
- " 56 - 60 years
- " 61 - 65 years

Discussion:

The present study is compared with the study conducted by Jit et al [5] as shown in table 3.

The present study is also compared with the study conducted by Gautam et al [10]. The present study shows 7.69, 9.09, 8.69 percent of complete fusion respectively in males and 33.3, 0 and 0 percent of complete fusion respectively in females in 35-40, 41-45, 46-60 age group where as the complete fusion is absent in both male and females as per Gautam et al. In present study in 51-55 age group in males complete fusion is seen in 12.5 % cases while in Gautam et al study it was 20% while both studies in female shows absent complete fusion in this age group. In present study in 56-60 age group in males complete fusion is seen in 14.29 % cases while in Gautam et al study it was 33.3 % while in female group, complete fusion was seen in 25 % cases as compared to absent complete fusion in Gautam et al study. In present study in 61-65 age group in males complete fusion is seen in 38.89 % cases while in Gautam et al study it was 40 % while in female group, complete fusion was seen in 37.50 % cases as compared to 33.3 % complete fusion in Gautam et al study.

Conclusion:

The earliest age of fusion of the Manubrium with the body of the sternum as per present study was 37 years in males and 35 years in the females (Since our first group was 35 to 40 years). The latest age of fusion of the Manubrium with the body of the sternum as per present study was 65 years in the both males and in the females (Since our last group was 60 to 65 years, which shows overall fusion of approximately 40%). From the present study, it was concluded that at the age group of 60-65 years, only 40% of population is showing fusion at Manubrio-sternal Joint by lateral view radiography. In rest of 60% of population, still the fusion is incomplete. So, Forensic Experts should be cautious while labelling the age of patient below 60 or 65 years on the basis of fusion of Manubrio-sternal Joint and vice versa.

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Table No 1 Showing distribution of cases according to sex and age

Each age group has more than 25 Cases

Table no 2 Showing relation between fusion of Manubrium with body of sternum according to age and sex

Table 3 Showing comparison of different studies showing complete fusion of manubrium with body of sternum with relation to age and sex

indicates that Jit et al [5] made 36 to 40 for both male and females

indicates Jit et al [5] made > 41 age group for females. Note: Percentage is calculated

Sex-wise per group.

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