

Fusion of Manubriosternal Joint: Role in Estimation of Age



Medical Science

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DR. JYOTI ASHA CHAMPI

M.B.B.S, M.D (F.M.T), MEDICAL OFFICER, DEPARTMENT OF FORENSIC MEDICINE & TOXICOLOGY, RAJENDRA INSTITUTE OF MEDICAL SCIENCES, RANCHI

*** DR. MATANGESHWAR NATH**

M.B.B.S, M.S (ANATOMY), ASSISTANT PROFESSOR, DEPARTMENT OF ANATOMY, HITECH MEDICAL COLLEGE, ROURKELA * Corresponding Author

ABSTRACT

Estimation of age of an individual from skeletal remains is a crucial step. Present work is an effort to study the sternum for estimation of age based on fusion of the manubriosternal joint. The sterna were obtained from the fifty one cadavers. The age and sex of the deceased were obtained. The collected specimens were cleaned and dried properly. For the estimation of age the sterna were examined for the presence or absence of fusion at Manubriosternal joint. The degree of fusion of the manubriosternal joint in the different age group of male and female were variable. Hence correct estimation of age based on fusion of manubriosternal joint alone is not a much reliable criterion.

INTRODUCTION:

Estimation of age at the death of an individual from unidentified skeletal remains is a crucial step in osteological analysis. If the entire skeleton is presented for age estimation then almost 100% accuracy can be obtained but with help of only skull or pelvis it is up to 90%. But without skull or pelvis it becomes fairly difficult to judge the age accurately. As complete skeletons are rarely recovered or preserved and skeletal remains get easily fragmented. For this reason, developing ageing criteria from various skeletal elements have been a primary research focus.

The correct determination of skeletal age is a critical requirement for medico-legal cases, and the accuracy with which ageing can be done depends on the nature of the materials and methods applied.

AIM OF THE STUDY:

As such, in the present work an effort is being made to study the role of fusion of manubriosternal joint of sternum for estimation of age of an individual.

NUMBER OF CASES:

Total fifty one sterna were observed, out of which thirty three were from male cadavers while eighteen were from female cadavers.

PLACE OF WORK:

This study was carried out in the Department of F.M.T and the Department of Anatomy, R.I.M.S, Ranchi during January 2012 to December 2012.

INCLUSION CRITERIA:

Only those cases with age more than 15 years were considered because the age related changes are prominent after puberty.

EXCLUSION CRITERIA:

Deformed, diseased and fractured sterna were not included in the study.

MATERIALS:

The materials for the present study consists of - Sterna obtained from the cadavers and water bath for washing and cleaning the obtained sterna.

METHOD:

The sterna were obtained from the cadavers in all the cases by careful dissection using a standard linear midline inci-

sion. The clavicles were disarticulated from the sternum.

The age of the deceased was obtained from the nearest relatives and police and was verified by the necessary documents. The age of the deceased was rounded off to full figures.

The sterna thus collected were put in a water bath for a week for maceration. These were cleaned and examined intermittently. After maceration and cleaning all the remains of the muscle and ligaments from the sterna, these were dried at room temperature.

For the estimation of age the elements of each sternum i.e. manubrium and body were examined for the presence or absence and degree of fusion at the Manubriosternal articulation.

OBSERVATION:

In male, partial fusion of manubrium with the body of sternum was first seen in the age group of 51 to 55 years, while the complete fusion was seen first in the same age group of 51 to 55 years. But even in this age group and further higher age groups manubrium was still in the stage of partial fusion and in some cases it was not fused at all with the body of sternum.

Age Group	Male			
	No. specimen	of Complete Fusion	Partial Fusion	No fusion
15-20	2	0	0	2
21-25	1	0	0	1
26-30	2	0	0	2
31-35	2	0	0	2
36-40	3	0	0	3
41-45	5	0	0	5
46-50	5	0	0	5
51-55	5	1	3	1
56-60	3	1	2	0
61 onwards	5	2	2	1

Table 1: Fusion of manubrium with the body of sternum in different age group of male:

Age Group	Female			
	No. specimen	of Complete Fusion	Partial Fusion	No fusion
15-20	1	0	0	1
21-25	1	0	0	1
26-30	1	0	0	1
31-35	2	0	0	2
36-40	3	0	0	3

41-45	3	0	1	2
46-50	2	0	1	1
51-55	1	0	1	0
56-60	1	0	1	0
61 onwards	3	1	2	0

Table 2: Fusion of manubrium with the body of sternum in different age group of female:

In female, partial fusion of manubrium with the body of sternum was first seen in the age group of 41 to 45 years while the complete fusion was seen first in the age group of 61 and onwards. But in some cases of this age group manubrium was still in the stage of partial fusion.

DISCUSSION:

Parikh observed that the manubrium unites with the body of sternum in old age, at about 60 years.

Mathiharan and Patnaik opined that the manubrium rarely unites with the body of sternum except in old age.

Glaister mentioned that in advanced life, the manubrium is occasionally joined to the body of sternum by bone; although only the superficial parts of the intervening cartilage is converted into bone.

Jit and Bakshi observed that complete fusion of manubrium with the body of sternum was seen at 21 years or above in both sexes; though non-fusion was seen even in a person above 60 years of the age.

Reddy and Krogmann mentioned, "The manubrium fuses with the body in old age.

Gatzoulis et al in Gray's Anatomy edited that the manubriosternal joint is usually symphysis, which ossifies in old age.

According to Dr. Anil Agarwal the manubrium unites with the body of sternum after the age of 60 to 70 years but often it remains separate.

Gautam R.S, Shah G.V Jadhav H.R and Gohil B.J, observed that the fusion of manubrium with body of sternum starts at the age of 40 and it is complete by the age of 55 years.

Wadhawan M, Murari A and Murali G summarized their findings regarding fusion of manubrium with the body in relation to the age as: Mean age for onset of fusion of manubriosternal joint in males was 42.6 ± 4.33 years while in females was 42.12 ± 3.27 years. Mean age for complete fusion of manubriosternal joint in males was 65.81 ± 10.68 years while in females was 58.36 ± 5.00 years.

CONCLUSION:

In the present study it is found that in male partial fusion of manubrium with the body of sternum was first seen in the age group of 51 to 55 years, while the complete fusion was seen first in the same age group of 51 to 55 years. In female partial fusion of manubrium with the body of sternum was first seen in the age group of 41 to 45 years, while the complete fusion was seen first in the age group of 61 years and onwards. But even in this age group and further higher age groups manubrium was still in the stage of partial fusion and in some cases it was not fused at all with the body of sternum.

So we must be cautious while assigning a particular age to an individual based on the state of fusion of manubrium with the body of sternum.

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