

RELATION OF HEART WEIGHT WITH AGE AND WEIGHT OF CADAVER

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Abstract

Publication Info

Paper Submission Date
05-04-2017

Paper Acceptance Date
20-05-2017

Paper Publication Date
July 2017

DOI
10.21761/jms.v2i01.10838

Introduction: Height, weight, and age of person has significant impact on the normal size of heart. These parameters need to be considered when cut-off values indicating the need for treatment or even surgery are established. The aim of present work is to study the relation of weight of the heart with age and weight of cadaver.

Material and Methods: The study was performed in the Department of Anatomy, Shri Ram Murti Smarak Institute of Medical Sciences, Bareilly on 30 hearts from embalmed cadavers. The hearts were procured from the cadavers available in our department. The heart was thoroughly cleaned and measurements were taken.

Results: The mean heart weight was 223.37 ± 57.78 g. Significant relationship between age of the cadaver and weight of the heart ($p=0.0004$), weight of cadaver and weight of heart ($p=0.0001$) was observed.

Conclusion: The above study provides valuable data of the heart in our geographical location, which may be useful for cardiac surgeons and physicians.

Keywords: Heart, Age, Weight, Cadaver

INTRODUCTION

The heart is a hollow, fibro muscular organ of a somewhat conical or pyramidal shape. It occupies the middle mediastinum between the lungs and pleurae enclosed in the pericardium. Its weight, in males, varies from 280-340 g (average 300g), in females, from 230-280g (average 250g). Cardiac weight is said to be about 0.45% of body weight in males and 0.40% in females; adult weight is achieved between 17-20 years.¹ Gender, height, weight and age significantly impact on the normal heart size. The aim of present study find out any correlation between heart weight with cadaveric age and weight of cadaver.

MATERIAL AND METHODS

The study was performed on 30 human hearts procured from museum and cadavers in the Department of Anatomy, Shri Ram Murti Smarak Institute of Medical Sciences, Bareilly. These hearts were thoroughly cleaned and fixed in 10% formalin. The age (inclusion age 15-65 years) and weight of cadaver were noted from the records. The weight of heart was measured by weighing machine. The hearts with gross anomaly were excluded from the present study and the following measurements were taken with the help of Digital Vernier Calliper.

The length of heart was measured from apex to crux of heart (Fig-1). (Crux is the meeting point of atrioventricular and posterior interventricular groove). Breadth of the heart is maximum transverse diameter of heart (Fig-2).

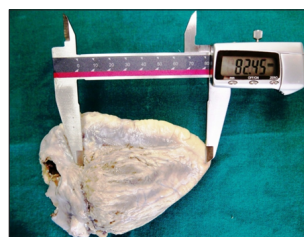


Fig.-1: Measuring length of heart



Fig.-2: Measuring breadth of heart

RESULTS

The mean heart weight of entire group is 223.37 ± 57.78 g (Range: 173.25 ± 18 g to 313.66 ± 43.66 g). The maximum weight of heart (313.66 ± 43.66 g) was found in the age group of 56-60 years while minimum weight (173.25 ± 18 g) of heart was found in the age group of 35-40 years (Table-1). The statistical analysis showed the significant relationship between the age of cadaver & weight of heart (correlation coefficient=0.5, $p=0.0004$). The present study also shows strong correlation between weight of cadaver and weight of heart such that higher weight of a cadaver had the higher weight of a heart. (correlation coefficient=0.67, $p=0.0001$)

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The present study shows the maximum length of the heart in the age group of 61-65 years (92 ± 25.45 mm) followed by the age group 46-50 years (84.49 ± 7.45 mm) and the age group 26-30 years (82.41 ± 5.17 mm). The minimum length of heart was seen in the age group of 36-40 years (70.14 ± 5.74 mm). The results indicate no definite pattern of length of heart in relation to age group (Table-1).

A positive relationship between age of the cadaver and the length of heart was found on statistical analysis (correlation coefficient=0.42, $p=0.0178$). When the length of the heart was compared with the weight of cadaver a highly significant correlation was observed (correlation coefficient=0.61, $p=0.0004$).

The average breadth of the heart was higher in the age group above 40 years (maximum- 98.5 ± 4.94 mm and minimum- 91.24 ± 6.50 mm). The age group below 40 years had a lower average breadth of heart (range- 83.55 ± 14.33 mm to 89.46 ± 0.76 mm). This shows that higher breadth was seen in higher age group as compared to lower age group (Table-1).

No significant correlation was observed between weight of cadaver & breadth of heart (correlation coefficient=0.26, $p=0.172$).

Table-1: Average weight of cadaver; weight, length & breadth of heart in various age groups

Age groups (years)	No. of hearts	Average weight of person (kg) \pm SD	Average weight of heart (g) \pm SD	Average length of heart (mm) \pm SD	Average breadth of heart (mm) \pm SD	Ratio of length to breadth
16-20	2	50 ± 2.83	211 ± 15.55	75.15 ± 3.04	85.77 ± 8.16	0.84
21-25	2	52 ± 2.82	207.5 ± 24.74	77.60 ± 0.55	89.46 ± 0.76	0.86
26-30	2	64 ± 11.31	245 ± 16.97	82.41 ± 5.17	84.11 ± 2.76	0.97
31-35	5	50.6 ± 5.77	185.8 ± 43.48	72.53 ± 8.59	85.71 ± 18.52	0.87
36-40	4	49 ± 10.73	173.25 ± 18.30	70.14 ± 5.74	83.55 ± 14.33	0.81
41-45	3	58.66 ± 3.21	232.33 ± 25.96	71.93 ± 6.90	91.24 ± 6.50	0.78
46-50	5	60.8 ± 11.69	217.8 ± 60.09	84.49 ± 7.45	93.87 ± 31.69	0.95
51-55	2	63.5 ± 2.12	252.5 ± 81.31	77 ± 9.89	98.5 ± 4.94	0.77
56-60	3	70.66 ± 18.58	313.66 ± 43.66	81.54 ± 3.15	93.36 ± 8.47	0.87
61-65	2	68 ± 11.31	260 ± 113.13	92 ± 25.45	97.5 ± 3.53	1.1

*SD = Standard Deviation

DISCUSSION

In the present study, the mean heart weight was 223.37 ± 57.78 g in our group of study population. Matsuyama T et al² found the mean heart weight was 334.9 ± 75.8 g on their study of European society which is more than our study. This may be attributed to the small sample size of the present study.

In present study statistical significant correlation was observed between age of the cadaver and the weight of heart signifying that there was increase in heart weight with increase in age. Similar observation was also seen by Schenk K E et al.³ They also mentioned that the width and length of the ventricles show minor alteration in size with

the increase in old age and with age heart weight increases. Our results were also supported by Adebo OA et al⁴ who found that increase in heart weight was correlated with increase in age. Dalane et al⁵ also quoted that with advancing age there is significant increase in heart weight.

In our study, length of heart is having positive correlation (correlation coefficient=0.42, $p=0.0178$) with the age in contrast to the study of Kibria G Met al⁶ who observed that the length of the heart showed insignificant positive correlation with the age of an individual. The validation of this result needs to be seen in a larger group of patients.

Our study shows that the breadth of the heart had direct correlation as the age advances. It reveals greater breadth in higher age group, though the statistical analysis did not prove as significant correlation.

CONCLUSION

The above study provides valuable data about cardiac dimensions in our group of patients which may be useful for cardiac surgeons and physicians. However, multicentre studies with larger sample size are required to provide more reliable and complete data.

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