Original Paper

A POST MORTEM STUDY ON THE LENGTH OF THE HUMAN ADRENAL GLANDS

Siddiqua D[1], Ara S[2], Nahar N[3], Hena H[4], Johora F[5]

Abstract

Objective: **A cross sectional descriptive type of study was designed to find out the difference in the length of the right and left adrenal glands of Bangladeshi people in relation to age and to compare with the previous studies.**

Methods: **The study was conducted in the Department of Anatomy, Dhaka Medical College, Dhaka during the period July 2008 to 2009 and performed on 140 post mortem human adrenal glands collected from 70 unclaimed dead bodies which were in the morgue under examination in the Department of Forensic Medicine, Dhaka Medical College, Dhaka. The samples were divided into four age groups including group A (11-20 years), group B (21-30 years), group C (31-40 years), group D (41-60 years). The lengths of the adrenal glands were measured and recorded.**

Results: **The length of the left glands was found larger than that of the right glands. There was no difference found in length of the right and left adrenal glands in any of the age groups. For the right adrenal gland the differences between group A and group B was statistically significant ($p<0.05$). For the left gland the differences between groups A & B and groups B & D were statistically significant ($p<0.05$).**

Keywords: **Adrenal gland, length, age group**

Introduction

In mammals, the adrenal glands (also known as suprarenal gland or glandular supra renalis)[1] are a pair of essential endocrine glands of human body. The adrenal cortex secrets three types of hormones. Those are mineralocorticoids, glucocorticoids and adrenal androgens. The mineralocorticoids are said to be lifesaving portion of the adrenocortical hormones. The glucocorticoids are equally necessary, allowing the person to resist the destructive effects of life's intermittent physical and mental stresses[2]. The adrenal medulla secrets adrenaline which is involved in "fight or flight" reaction along with cortisol. Any deviation from the normal functions of the adrenal glands certainly deranges the harmony of life. Adrenal pathology can manifest in various ways either hypofunctional caused by primary atrophy, tuberculous destruction, adrenal cancer etc. or hyperfunctional caused by hyperplasia, adrenal tumours etc[3]. Exact knowledge of the normal morphometry e.g. the length of adrenal gland, may facilitate the surgeons, endocrinologists, pathologists and radiologists to adopt appropriate diagnosis and treatment of various clinical conditions associated of the adrenal glands. Moreover it has been observed by various researchers that the dimensions of different organs in Bangladeshi population have got variations from those of the western population. It is also observed by reviewing the literatures and the texts that several works have been done on the morphological aspects of the adrenal glands in foreign countries, but sufficient attention has not been given in morphological experiment in Bangladesh.

This study was designed to see the length of this important gland in different age groups and to find out whether there was any variation with age in

1. Dr Dilruba Siddiqua MBBS, M Phil, Assistant Professor, Department of Anatomy, Ibn Sina Medical College Dhaka, yazdi886@hotmail.com; 2. Professor Shamim Ara MBBS, M Phil, M MEd, Proffesor and Head Department of Anatomy Dhaka Medical College Dhaka; 3. Dr Nurun Nahar MBBS, M Phil, Assistant Professor, Department of Anatomy, Ad Din Medical College Dhaka; 4. Dr Hasna Hena MBBS, M Phil, Assistant Professor, Department of Anatomy, East West Medical College Dhaka; 5. Dr Fatema Johora MBBS, M Phil, Assistant Professor, Department of Anatomy Faridpur Medical College, Faridpur.

Bangladeshi people as well as with those of the western people.

Material and Method

A cross-sectional descriptive type of study was designed and conducted in the department of Anatomy, Dhaka Medical College, Dhaka during the period July 2008 to June 2009. The study was based on collection of 140 human adrenal glands from 70 unclaimed dead bodies that were under examination in the Department of Forensic Medicine, Dhaka Medical College Dhaka, from November 2008 to April 2009. All the samples were collected within 24-36 hours of death without any sign of putrefaction. Adrenal glands were collected from medicolegal cases excluding poisoning, any cutting or crushing injury to the adrenal gland, glands found in one side only and known case of adrenal disease. Approved by the Ethical Review Committee of Dhaka Medical College Dhaka was obtained.

After isolation, the samples were divided into four age groups and were marked as group A (11-20 years), group B (21-30 years), group C (31-40 years), group D (41-60 years) according to Kangarloo et al[4]. Numbers of glands are of various groups are shown in Table I. After collection adrenal glands were dried with blotting. The length of each adrenal gland was measured separately in centimeter (cm) from one end of the medial border to another end of the gland by using a slide calipers (Fig-I).

Collected data were processed and statistical analyses were done using SPSS 11.0 version. Unpaired Student's t test and One-way ANOVA (PostHoc) were done as applicable. Differences were considered significant where p value observed <0.05. Data were expressed as mean±SD and categorical data in frequency (f) as appropriate.

Table -I: Grouping of the sample of the present study (n=140)

Group	Age range	Right Gland (frequency)	Left Gland (frequency)
A	11-20	10	10
B	21-30	15	15
C	31-40	25	25
D	41-60	20	20
Total		70	70

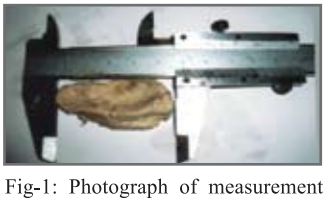

Fig-1: Photograph of measurement of the length of the adrenal gland by using a slide calipers

Results

The left glands was larger than that of the right glands. There was no difference found in length of the right and left adrenal glands in any of the age groups. For the right adrenal gland the differences between group A and group B was statistically significant ($p<0.05$). For the left gland the differences between group A and group B and that between group B and group D were statistically significant ($p < 0.05$).

Table -II: Length of right and left adrenal gland in different age group

Age Group	Length (cm)		p value
	Right	Left	
	Mean±SD (range)	Mean±SD (range)	
A (n=10+10)	5.11±0.26 (4.70-5.50)	5.22±0.25 (4.80-5.60)	>0.10
B (n=15+15)	4.92±0.28 (4.040-5.40)	5.02±0.28 (4.50-5.50)	>0.10
C (n=25+25)	5.10±0.17 (4.70-5.30)	5.10±0.17 (4.80-5.40)	>0.05
D (n=20+20)	5.06±0.21 (4.70-5.50)	5.17±0.20 (4.80-5.60)	>0.05
Statistical analysis between groups			
A vs B	P<0.05*	P<0.05*	
A vs C	p>0.10	p>0.10	
A vs D	p>0.50	p>0.50	
B vs C	p>0.10	p>0.10	
B vs D	p>0.05	P<0.05*	
C vs D	p>0.10	p>0.10	

*=significant

Discussion

The highest length (mean±SD) observed in the study series was 5.22±0.25 cm in group A (age 11 to 20 years). Arey[5], Ross et al[6] and Glass & Mundy[7] observed that the mean length of the adrenal gland was 5 cm. The value is almost similar to the present study. Anand et al[8] conducted an studied on 40 suprarenal gland and observed that the mean length in the adult group was 4.5 cm. That finding is lower than the finding of the present study. This may be due to measurement of the gland by ultrasonogram. Lam, Chan and Lo[9] studied 333 postmortem Chinese

people and found that the left gland was 5.2 cm and the right one is 4.8 cm long. This finding has similarity with the mean length of adrenal gland of group B (21 to 30 years) of the present study. Bhagheri B[10] conducted studied on 20 adult subjects using Proton Emission Tomoghraphy and observed that the length of adrenal gland was 4 to 6 cm. This value is similar to the result of the present study. Rumack et al[11] in their study by using ultrasonogram found that the length of the adrenal gland was 4 to 6 cm. The finding of the present study corresponds to their findings.

Conclusion

The results of the present study can be used as a standard reference length for the adrenal glands of Bangladeshi people and to determine the abnormal evidences in Forensic and Pathologic corpses.

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