

# Morphometry and Histogenesis of Human Fetal Suprarenal Gland in Different Gestational Age Groups

S Sathiya \*

Department of Anatomy, Sree Balaji Medical College & Hospital Affiliated to Bharath Institute of Higher Education and Research, Chennai, Tamil Nadu, India

## ABSTRACT

During the fetal life there is a remarkable increase in the size of the suprarenal glands mainly due to the presence of a well-developed fetal zone, which involutes after birth. This zone comprises about 80% of the fetal suprarenal cortex at term. In this study the different morphological and histological variations of the suprarenal gland in I, II, III trimesters were analysed. The size of the suprarenal gland plays a major role in its functional activity and indirectly evaluates the wellbeing of the fetal health and development. Thus the present study may be useful for clinicians especially in understanding the normal pattern of suprarenal development in fetal period and also to delineate any abnormal developmental problems. The results obtained from this study will be beneficial in understanding the development of suprarenal glands and also contribute to future studies in obstetrics, perinatology, and fetopathology and in radio diagnosis.

**Key words:** Perinatology, Fetopathology, Fetal

**HOW TO CITE THIS ARTICLE:** S Sathiya, Morphometry and Histogenesis of Human Fetal Suprarenal Gland in Different Gestational Age Groups, J Res Med Dent Sci, 2021, 9(8): 138-140

**Corresponding author:** S Sathiya  
**e-mail** ✉: editor.pubs@gmail.com  
**Received:** 16/07/2021  
**Accepted:** 11/08/2021

## METHODOLOGY

A total number of 33 normal human foetuses, eleven from each trimester (I, II, III) were collected. Comparison between the right and left suprarenal glands showed that the left was heavier than right in weight and also larger in dimensions in the 1st trimesters. The analysis of data in second trimester showed that the following parameters like thickness a weight were greater in kidney when compared to respective suprarenal glands but the breadth of the suprarenal gland was greater than the respective kidney. In the 3rd trimester the breadth of the suprarenal gland was greater than the respective kidney, also the weight of left suprarenal gland was heavier than the right suprarenal gland. Similar results were seen in adult samples (Table 1).

## INTRODUCTION

Suprarenal gland also known as adrenal gland is paired structures which are situated on the upper pole of each kidney. During fetal development, suprarenal hormones like Dehydroepiandrosterone-sulphate (DHEA-S) are involved in the maturation of the lung and other developing systems. The suprarenal gland has an impressive ability to synthesis large amount of adrenal androgens which is also used by placenta to produce oestrogen. This study aims to Analyse and compare the morphology and the histological features of fetal suprarenal gland in various trimesters including the adult [1-5].

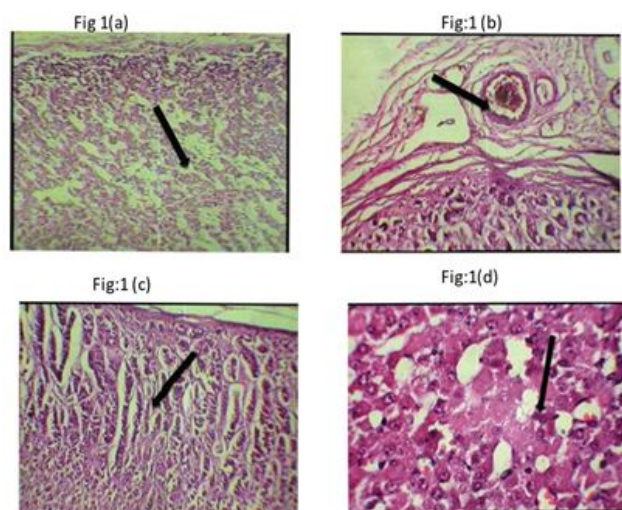
**Table 1: Average dimensions of suprarenal gland and kidney.**

Parameters	Trimester I			
	Suprarenal gland		Kidney	
	Right	Left	Right	Left
Length (cm)	0.27	0.3	0.33	0.33
Breadth (cm)	0.17	0.28	0.17	0.17
Thickness (cm)	0.07	0.07	0.11	0.12
Weight (gm)	0.12	0.14	0.13	0.14

Trimester II

Length (cm)	1.87	1.77	1.76	1.8
Breadth (cm)	1.25	1.73	1.18	1.18
Thickness (cm)	0.62	0.71	0.99	1
Weight (gm)	1.09	1.59	1.79	1.84
Trimester III				
Length (cm)	1.69	1.8	2.25	2.3
Breadth (cm)	1.43	1.1	1.38	1.33
Thickness (cm)	0.49	0.75	1.14	1.2
Weight (gm)	1.69	1.79	3.03	3.1
Trimester IV				
Length (cm)	4.4	4.68	10.13	10.23
Breadth (cm)	2.7	2.8	5.2	5.3
Thickness (cm)	0.89	0.9	2.5	2.6
Weight (gm)	4.2	4.5	13.1	14.7

The micrometry of suprarenal gland in 1st trimester shows reveals that medulla was characterized by presence of blood vessel and few chromaffin cells (Figure 1A). The medulla was rich in blood vessels, large chromaffin cells with pale staining cytoplasm and large peripherally placed nuclei are seen and also few sympathetic ganglion cells were present in 2nd trimester (Figure 1B). In the third trimester no distinct boundary between cortex and medulla were seen (Figure 1C). In the adult cases, Zona reticularis is characterized by the presence of reticular arrangement of cells with plenty of sinusoids. Medulla is characterized by large blood vessels and well defined chromaffin and sympathetic ganglion cells. There was a sharp demarcation between the cortex and medulla was noted (Figure 1D).



**Figure 1: Microanatomy of suprarenal gland.**

#### DISCUSSION AND CONCLUSION

The micrometric analysis showed that there was a progressive increase in the thickness of the capsule from 27.3 microns in first trimester to about 163.8 microns in

adults. The cortex and medulla also showed progressive increase in thickness, with cortex showing maximum increase in thickness from 72\8 microns in first trimester to about 1911 microns in adult. The histological studies are similar to the findings of previous studies [6-11]. Hence the results obtained from this study will be beneficial in understanding the development of suprarenal glands and also contribute to future studies in obstetrics, perinatology, fetopathology and in radio diagnosis.

#### REFERENCES

1. Anand MK, Anand C. Morphology of human suprarenal gland: A parameter for comparison. *Surg Radiol Anat* 1998; 20:345-349.
2. Benner MC. Studies on the involution of the fetal cortex of the adrenal glands. *Am J Pathol* 1940; 16:787-798.
3. Carr BR, Casey ML. Growth of the adrenal gland of the normal human fetus during early gestation. *Early Human Develop* 1982; 6:121-4.
4. Crowder RE. The development of the adrenal gland in man, with special reference to origin and ultimate location of cell types and evidence in favour of the "cell migration" theory. *Contemp Embryol* 1957; 251:195-209.
5. Sangma GT, Ibochouba Y, Damayanti N. Development and maturation of suprarenal glands in human fetuses. *J Anatom Society India* 2008; 57:1-7.
6. Gaillard DA, Lallemand AV, Moirrot HH, et al. Fetal adrenal development during the second trimester of gestation. *Pediat Pathol* 1990; 10:335-50.
7. Hatano O, Takakusu A, Nomura M, et al. Identical origin of adrenal cortex and gonad revealed by expression profiles of Ad4BP/SF-1. *Genes Cells* 1996; 1:663-671.

8. Bang N. Shape, size, weight and relations of human right suprarenal gland. *J Anatomical Society India* 1987; 36:73-81.
9. Keene MFL, Hewer EE. Observations on the development of the human suprarenal gland. *J Anat* 1927; 61:302- 324.
10. Lewis E, Kurz AB, DubbinTA, et al. Real-time ultrasonographic evaluation of normal fetal adrenal glands. *J ultrasound Med* 1982; 1:265-270.
11. McClellan M, Brenner RM. Development of the fetal adrenals in nonhuman primates: Electron microscopy. In: Novy MJ, Resko JA (Eds) *Fetal endocrinology*. Academic Press, New York, 1981; 383-403.