

**MACROSCOPIC STUDY OF SUPRARENAL GLANDS IN HUMAN FETUSES**D. Gangulappa<sup>1</sup>, R. Somasekhar<sup>2</sup>**HOW TO CITE THIS ARTICLE:**

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**ABSTRACT:** One hundred and ninety nine suprarenal glands both right and left of different age groups of one hundred aborted fetuses were studied. Out of 100 fetuses, 42 were female and 58 were male, which were divided into groups according to the gestational age. The size and shape of each suprarenal gland was measured. The length, width, thickness and weight of each supra renal gland was measured. The mean length, width, thickness and weight of right suprarenal gland in fetuses of 20 weeks to full term were found to be 1.51 cm, 1.66 cm, 0.71 cm, 1.39gms. Shape of right supra renal glands was pyramidal in 92 fetuses & triangular in 7 fetuses. It was absent in one fetus (Fig. No.1). The mean length, width, thickness, and weight of left supra renal gland are found to be 1.69 cm, 1.96 cm, 0.89 cm, 1.67 grams. Shape of left supra renal gland was semilunar. The left suprarenal glands were found to be consistently heavier than the right throughout fetal period and width also higher than the length. The parameters of suprarenal glands are useful indicators to assess the growth and maturation of fetal adrenal glands. Knowledge of these variations are important in diagnosis of abnormalities of suprarenal glands like congenital adrenal hyperplasia and hypoplasia.

**KEYWORDS:** Adrenal glands or Suprarenal glands.

**INTRODUCTION AND REVIEW OF LITERATURE:** In the body transmission of messages occur through nervous system and by chemical substances. The chemical substances elaborated by the cells of certain organs are liberated into the blood. The organs producing them are called endocrine glands. Human endocrine system is the most complicated system, which is yet to be completely explored and understood.

EUSTACHIUS (1563) gave the first clear anatomical description of the adrenal glands. The first physiological observation was made by ADDISON (1855).<sup>1</sup> Addison opened the door and allowed us our first peep into the working of the adrenals, at the same time laying the foundation stone of the temple of endocrinology. He observed that patients with adrenal insufficiency often died from minor infections and stress.

SALMI et. al observed that the weight of the suprarenal gland increased faster until the fourth month, whereas after that the growth became slower.<sup>2</sup> T. TANIMURA et al (1971) observed that increasing in supra renal gland weight was gradual suggesting a steady growth.<sup>3</sup> CARR B. R. and CASEY M. L. (1982) observed that there was slow increase in adrenal gland weight between 6 to 12 weeks of gestation, there after the rate of increase was rapid.<sup>4</sup> K. ANAND et al (1997) observed forty supra renal glands, 20 being from aborted fetuses of 9 to 36 weeks and 20 obtained from human cadavers of age 1 day to 60 years. The mean length, breadth & thickness in fetuses of 9-36 weeks were found to be 1.4 cm, 1 cm and 0.45 cm respectively. The commonest shape of suprarenal gland on the left side was semilunar and right side it was highly variable, triangle, tetrahedral or inverted Y or V shaped.<sup>5</sup>

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P. R. SINGH et al. (2002) observed in 20 suprarenal glands from 10 aborted fetuses, shape of the left suprarenal glands were semilunar, whereas on right side they were tetra hydral or pyramidal and a significant increase in dimension was observed.<sup>6</sup> NOWAK et al (2007) observed that differences in the mass and linear dimensions of left and right supra renal glands. They were recorded from the 5<sup>th</sup> to 7<sup>th</sup> month of gestation. The mass & volume of the left supra renal gland were higher than those on the right side.<sup>7</sup> G.T.N. Sangma et al (2008) observed gross morphology of one hundred and two suprarenal glands both right and left of different age groups. The shapes of both right and left suprarenal glands were similar till 18<sup>th</sup> week., thereafter the left became semilunar or crecent shaped. The left suprarenal gland was found to be consistenly heavier than the right throughout fetal period.<sup>8</sup>

**MATERIALS & METHODS:** The Materials used for present study are 100 dead fetuses ranging from 20 weeks to full term, which have been randomly collected from Government maternity hospital, Hanamkonda and Chanda Kanthaiah Memorial Maternity hospital, Warangal in Warangal district of Telangana State. The age of fetuses were calculated from Crown - Rump Length & Weight (before injecting formalin). The fetuses were fixed in 10% formalin for 3 months before the dissection was carried out. The specimens were divided into groups according to their gestational age. Normal parameters of right and left suprarenal glands i.e. length, width, thickness, weight and shape were recorded.

**OBSERVATION:** The present study showed that shape of the right supra renal gland between 20 weeks to full term was pyramidal in 92 fetuses, triangular in 7 fetuses & in one fetus right supra renal gland was absent. (Fig. No.1) whereas the left supra renal glands was semilunar (or) crescentric in all hundred fetuses.

Weight of suprarenal glands increased with fetal gestational age, but the left was found to be consistently heavier than the right throughout fetal gestational age. The rate of increase in weight was gradual and steady except between 33 weeks to full term. In this period (33 weeks to full term) rapid increase of the weight was observed in both right and left supra renal glands. The mean weights of right and left supra renal glands between 29 weeks to 32 weeks were 1.44 gm and 1.80 gm. But between 33 weeks to full term, mean weights of right and left supra renal glands were 3.03 gm and 3.44 gm (Table No. 1) (Fig. 2, 3, 4, 5).

The lengths of right and left suprarenal glands were found to be increasing gradually and uniformly with the fetal age except slight increase in the rate of growth between 33 weeks to full term. The mean lengths of right and left supra renal glands between 29-32 week were 1.42 cm and 1.62 cm, but in between 33 weeks to full term, mean lengths were 2.3 cm and 2.48 cm. The mean lengths of both right and left supra renal glands in fetuses of 20 weeks to full term were 1.6cm (Table I).

The width of both right and left suprarenal glands were found to be increasing gradually and uniformly throughout the period of gestation (Table No. 1). It was observed that the width of left supra renal gland was larger than the right supra renal gland throughout the gestational period (Table No. 1).

Thickness of both right and left suprarenal glands showed gradual increase with the fetal age between 20 weeks to full term.

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**DISCUSSION:** According to K. Anand et al (1997), the mean length of each gland in fetuses of 9 weeks to 36 weeks was 1.4 cm<sup>5</sup>. In the present study, the mean length of both right and left supra renal gland in fetuses of 20 weeks to full term was 1.6. It is in correlation with that of the previous study.

According to Lewis. E et al (1982), the length of fetal supra renal glands after 30 weeks of gestational age was ranging between 1.4 cm to 2.2 cm.<sup>9</sup> In present study, the length of supra renal glands in fetuses between 29 weeks to full term was ranging between 1.2 cm to 3.5 cm. The values are slightly higher than those of the above study.

According to K. Anand et al (1997), the mean width and thickness of both right and left suprarenal glands in fetuses of 9 weeks to 36 weeks were 1 cm and 0.45 cm.<sup>5</sup> In present study, the mean width and thickness of both right and left supra renal glands in fetuses of 20 weeks to full term were 1.81 cm and 0.80 cm. This is slightly higher than those of previous study. The above discrepancy could be because of study of fetuses aged between 9 weeks to 36 weeks and in the present study, the fetuses aged between 20 weeks to full term.

According to Gaillard D.A. Et al (1990) the weight of supra renal glands in fetuses of 15 to 27 weeks of gestation was ranging from 0.2gm to 1.5gm.<sup>10</sup> In the present study, the weight of supra renal gland in fetuses of 20 to 28 weeks were ranging from 0.28gm to 1.96gm. It is in correlation with that of the previous study.

Gaillard d. et al (1990), Dr. Damayanthi et al (2005), G.T.N. Sangma et al (2008) observed both right and left supra renal glands in different periods of gestation. According to them the left supra renal gland is heavier than the right in all age groups.<sup>11</sup> In present study also the left supra renal gland was heavier than the right supra gland throughout fetal period between 20 weeks to full term.

K. Anand et al (1997), P.R. Singh (2002) & G.T.N. Sangma (2008) observed the shapes of both right and left supra renal glands in different age groups of fetuses. According to them the shapes of right supra renal gland were triangular, tetrahedral (or) pyramidal, but the left supra renal gland was semilunar in shape throughout gestational period. In present study the shape of the left supra renal gland was semilunar in all 100 fetuses. Whereas right was triangular in 7 fetuses and pyramidal in ninety two fetuses and in one fetus, right supra renal gland was absent (Fig. No.1)

The present study was undertaken to know the normal shape, size and weight of supra renal glands in fetuses between 20 weeks to full term. Most of the parameters of the present study are correlating with the available literature. The parameters are useful indicators to assess the growth and maturation of fetal adrenal glands. Knowledge of the variations is important in the diagnosis of abnormalities of supra renal glands like congenital adrenal hyperplasia and hypoplasia.

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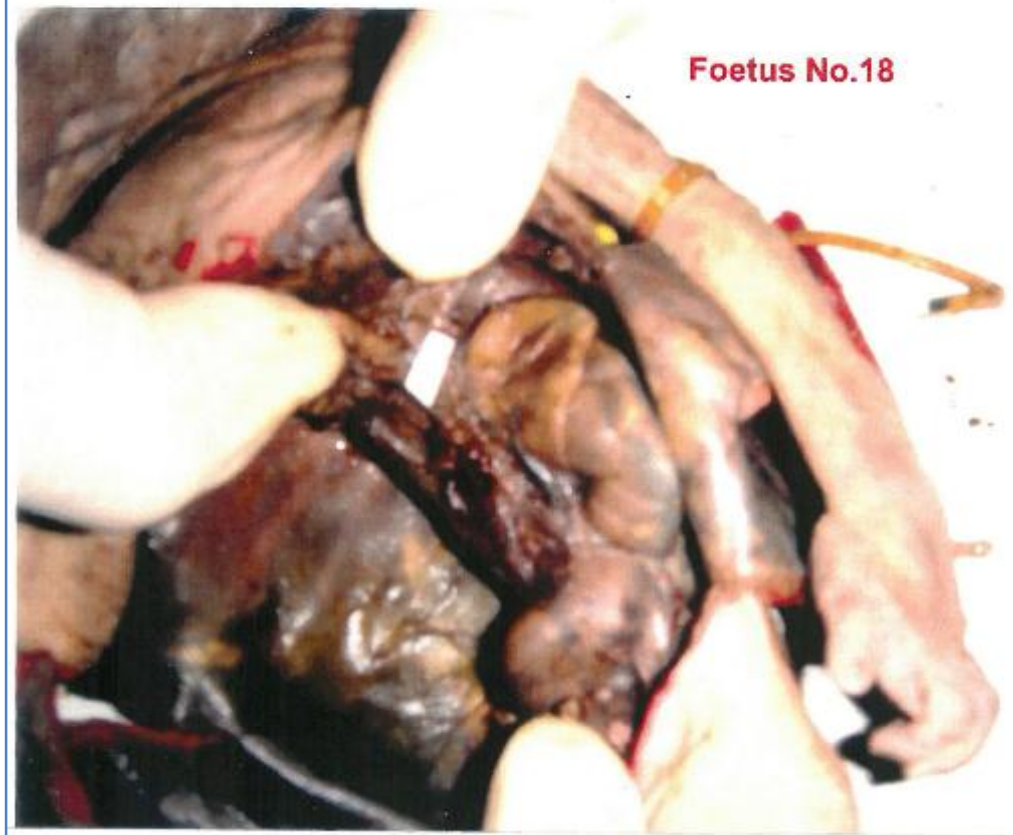
**TABLE – 1**

**SHOWING MEAN VALUES OF VARIOUS PARAMETERS OF  
RIGHT AND LEFT SUPRARENAL GLANDS IN  
DIFFERENT GESTATIONAL AGES**

Parameters	Age Group	20-24 weeks	25-28 weeks	29-32 weeks	33 weeks - Full term	Total Average	Mean
	No.of fetuses	24	22	21	33	100	
Length (in cm)	Right	1.03	1.28	1.42	2.31	1.51	1.6
	Left	1.20	1.46	1.62	2.48	1.69	
Width (in cm)	Right	1.30	1.39	1.58	2.40	1.66	1.81
	Left	1.48	1.67	1.93	2.78	1.96	
Thickness (in cm)	Right	0.48	0.49	0.80	1.09	0.71	0.80
	Left	0.57	0.60	1.02	1.39	0.89	
Weight (in grams)	Right	0.52	0.59	1.44	3.03	1.39	1.53
	Left	0.63	0.81	1.80	3.44	1.67	

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**Fig No:1 showing absence of right supra renal gland**



**Fig No:2&3 Showing 28 Weeks of Fetus Weights of Right and Left Suprarenal Glands**





**Fig No: 4&5 Showing Full Term Fetus Weights of Right and Left Suprarenal Glands**

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