

STUDY OF MORPHOGENESIS OF SUPRARENAL GLAND IN HUMAN FOETUSES OF DIFFERENT GESTATIONAL AGESR. Malleswara Rao¹, S. Ravindra Kishore², C. Rajeev Kumar³**HOW TO CITE THIS ARTICLE:**

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ABSTRACT: Study of development of any endocrine organ is of great utility and to understand the logical concept of the adrenal function is important and the metabolism of fetuses and its role in the maturation of foetal organs are the principal motives for paying more attention to this organ. The control of the gland is important in normal as well as in risk pregnancies. The growth of foetus is more effected in diabetes and hypertensive pregnancies. **MATERIALS AND METHODS:** The present work is done in human fetal Suprarenals of 50 foetuses of different gestational ages (12 to 40 weeks) collected in the department of Obstetrics and Gynaecology, Rajiv Gandhi institute of medical sciences hospital, srikakulam. The foetuses were subjected to dissection and later measured with thread, measuring tape and vernier calipers. **CONCLUSIONS:** In the present study the left suprarenal glands are longer than right suprarenal glands and a slow increase in size has been observed.

KEYWORDS: Suprarenal gland, Adrenal cortex, Adrenal medulla, Crown rump length, Vernier calipers.

INTRODUCTION: Study of the development of any endocrine organ is not of mere theoretical interest but it also enables the specialist to trace the homologies through various groups of vertebrates.⁽¹⁾ It is of great utility to any one beginning the study of endocrinology and to understand the logical concept of the adrenal function as several separate endocrine glands within one anatomical structure. Adrenal medulla is an extension of the sympathetic nervous system which secretes catecholamines. Most of the Adrenal cortex form part of hypothalamic pituitary adrenal axis. The smaller outer glomerulosa controls the Renin Angiotensin system.

The adrenal gland derives its name due to its proximity and situation atop the kidneys specifically on their anterosuperior aspect.⁽¹⁾ It is separated into two distinct structures both of which receive regulatory input from the nervous system. The role of adrenal gland in the metabolism of foetus and its role in the maturation of foetal organs are the principal motives for paying more attention to the vital organs, which is still a great enigma for gynecologists.⁽²⁾

The control of the gland is important in normal as well as in risk pregnancies. Of the entities that most often imperil the growth of the foetus and adrenal glands are Diabetes mellitus and Hypertension in pregnancy.⁽³⁾ Brown and Singer (1998) derived some conclusions from pathological findings, in fetuses from unsuccessful pregnancies of patients with hypertension.⁽⁴⁾

Bronsterin et al (1993) succeeded in visualizing and detecting fetal adrenal glands by transvaginal ultrasound examinations even in the 12th week.⁽⁵⁾ Jeanty and Romero performed a successful trans abdominal ultrasound examination in the 23rd week of gestation.

Further the emphasis on the development of fetal adrenals aids in the understanding of the adult structure. Even though full details are available as far as the adult adrenals are concerned, literature on fetal adrenals is found wanting.

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In the present study the existing literature on the fetal adrenals has been thoroughly reviewed and observations are made after study of 50 fetal adrenals of different gestations (12 week to 40 weeks).

MATERIALS AND METHODS: The present work is the result of study of human fetal suprarenals 50 in number obtained from Rajiv Gandhi Institute of medical sciences general Hospital, srikakulam from department of Obstetrics and Gynaecology. Age of the fetuses ranged from 12 to 40 weeks. The fetuses of earlier weeks could not be procured. The age of the fetus is judged by Crown Rump Length. Thereafter all these 50 fetuses were fixed in 10% formalin for 10 days. Then the fetuses were subjected to dissection. The anterior abdominal wall is dissected, the liver and gastrointestinal tract are removed to view the suprarenals in its natural location for proper recording.

The specimens of the human fetuses utilized in the present study were categorized into three groups. 1st group-12 weeks, 2nd group - 13th to 24 weeks and 3rd group 25th to 40 weeks.

The following measurements were taken with the help of thread and measuring tape, Vernier's calipers.

1. Length and breadth of suprarenals by using thread and measuring tape
2. Thickness of the suprarenal by using Verner's calipers.

OBSERVATIONS: 50 foetuses collected for the present study have been grouped into 3 categories as follows.

1. Group I - upto 12 Weeks
2. Group II - 13 to 24 Weeks
3. Group III - 25 to 40 Weeks

There is only one foetus belonging to group I. 8 Foetuses belong to group II. And 41 belong to group III.

The supra renal glands at 12 weeks foetus are tongue shaped, yellowish mass related to the supra medial pole of corresponding kidney. The difference in the shape could be noticed gradually from 16th weeks onwards by 22 weeks the right supra renal gland is of tetrahedron and the left supra renal gland is of crescentic shape. By 28th week of gestation, more definite shape has been assumed by right one as typical tetrahedron and left one as crescentic ⁽⁵⁾. Hilum has been seen deeper than before on the anterior surface. The ration between supra renal gland and the kidney has been gradually reduced by 28th week.

Size: A gradual increase in the size during the II trimester has been noticed. The increase in length varied from 1.2 cms to 2.5 cms. & breadth varied from 1 cm to 2.5 cms. Thickness varied from 0.4cms to 0.7 cms. In the III trimester there is a variation in the length of the supra renal glands the minimum length of left supra renal gland is 1.2 cms and the maximum length is 2.9cms. Only one foetus of 23 cms CRL (Crown-Rump Length) with gestational age of 26 weeks showed 1.2 cms length of left supra renal gland.

The breadth of left supra renal gland in III trimester varied from a minimum of 0.6cms to maximum of 3.5cms. Only one foetus having 27.5cms CRL and 28 weeks gestation recorded of lowest reading of 0.6 cms. Similarly one foetus having 30.5cms CRL with gestational age 30 weeks showed the maximum breadth as 30.5 cms in contrast to 3 cms maximum breadth recorded in an adult left supra renal gland.

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The thickness of left supra renal gland of III trimester varied from 0.3 cms to a maximum of 0.8 cms. The minimum recording of 0.3 cms has been noted in foetuses of 26 weeks, 28 weeks and 32 weeks gestation.

RIGHT SUPRA RENAL GLAND:

II Trimester: The length of the right supra renal gland in the II trimester varied from 1.2 cms to 2.5 cms. Breadth varied from 1.4 cms to 2 cms, thickness varied from 0.3 cms to 1.3 cms.

III Trimester: In the III trimester length of right supra renal gland varied from 1.3 cms to maximum of 2.5 cms with the exception of one foetus of 26 weeks gestation. Having a length 1 cms, a foetus of 32 weeks gestation having a length of 1.2 cms. The breadth of right supra renal gland varied from 1.3 cms to 2.8 cms. Foetuses of 28 weeks gestation had a breadth of 1 cms., 32 weeks gestation 1.4 cms, 38 weeks gestation 2.2 cms and 34 weeks gestation recorded a maximum of 2.8 cms.

Thickness of right supra renal gland in the III trimester varied from 0.3 cms to maximum of 0.7 cms.

The variations in the morphometric measurement of left and right supra renal glands is because of relative reduction in the activity of supra renal glands and also the nutritional state of the foetus.⁽⁶⁾

SUMMARY AND CONCLUSIONS: Summarizing the following conclusions are drawn out.

- Suprarenal gland is developed from the mesoderm of posterior abdominal wall in the angle between the root of mesentery and developing gonad and also from neural crest.
- Foetal suprarenals are relatively large. At 16th week of gestation the glands are large than the kidneys.⁽⁷⁾
- The reduction in the size of the gland has been noticed by the time of birth.
- The foetal cortex that undergoes involution and necrosis with a net loss of 50% of gland within 2-3 weeks.
- Even though many variations relating to the weight and size of the gland in different mammals including humans have been notified by different authors, in the present study the differences in the morphometric findings are not much appreciated.⁽⁷⁾
- In the present study the left suprarenal glands are large than right suprarenal glands confirming the observations of earlier authors.
- A slow increase in the size of suprarenal glands has been observed confirming in the reports of earlier authors.⁽⁸⁾
- Tongue shaped suprarenal gland is observed at 12th week of gestation. Right suprarenal gland is of tetrahedron shape and left is of crescentic.⁽⁹⁾
- Even though a steady growth has been observed, the growth spurts that are mentioned by GTN Sangma et al (2008) have not been found and confirmed.^(5,10)
- Lastly all the above findings are in conformity with the observations of most of the earlier authors.

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CRL	Age in weeks	Left SRG Length in CMS	Left SRG Breadth (Cms)	Left SRG thickness (Cms)
17 cms	18	1.2	1	0.6
19 cms	21	1.4	1.3	0.4
21 cms	24	2.5	2.5	0.7
21.5 cms	22	1	1.5	0.5
22.5 cms	26	1.5	1.5	0.6
23 cms	26	1.2	1.4	0.3
27.5 cms	28	1.7	0.6	0.3
28 cms	30	2.7	1.5	0.5
28.5 cms	30	2.7	2.7	0.6
31 cms	32	2	2.8	0.8
30.5 cms	30	2.1	3.5	0.6
31 cms	32	2.9	1.5	0.5
30 cms	30	2.4	2.6	0.6
32 cms	32	2.6	1.2	0.3
31 cms	32	2.7	3	0.3
33 cms	34	2.5	2.1	0.4
36 cms	34	2.4	2.6	0.6
39 cms	37	2.2	2.8	0.4
39 cms	36	2.2	2.8	0.4
39.2 cms	37	2.5	3.2	0.6

TABLE I: MORPHOMETRY OF LEFT SUPRARENAL GLAND

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CRL (cms)	Age in weeks	Right SRG Length in CMS	Right SRG Breadth (Cms)	Right SRG thickness (Cms)
17 cms	18	1.3	1.1	0.3
19 cms	21	2	1.4	0.6
21 cms	24	2.5	2	1.3
21.5 cms	22	1.2	1.3	0.5
22.5 cms	26	1.3	1.3	0.3
23 cms	26	1	1.2	0.3
27.5 cms	28	1.2	1.0	0.5
28 cms	30	1.5	1.6	0.7
28.5 cms	30	2.2	2.6	0.6
31 cms	32	2.5	2	0.5
30.5 cms	30	2.1	2.2	0.4
31 cms	32	2.4	2.3	0.3
30 cms	30	2.5	2.5	0.5
32 cms	32	2	1.4	0.6
31 cms	32	1.2	2	0.5
33 cms	34	2.3	2.8	0.7
36 cms	34	2	1.8	0.5
39 cms	37	3	3	0.4
39 cms	36	1.6	2	0.5
40 cms	38	1.8	2	0.5

TABLE II: MORPHOMETRY OF RIGHT SUPRARENAL GLAND



Fig. 1: Showing Suprenal Glands at 12wks gestation



Fig. 2: Showing Suprenal Glands of 12 and 14wks gestation



Fig. 3: Showing SRG at 14 wks gestation



Fig. 4: Showing SRG at 16 wks gestation



Fig. 5: Showing tetrahedron shape of SRG at 22 wks



Fig. 6: Right tetrahedron, left SRG crescentic at 28 wks gestation

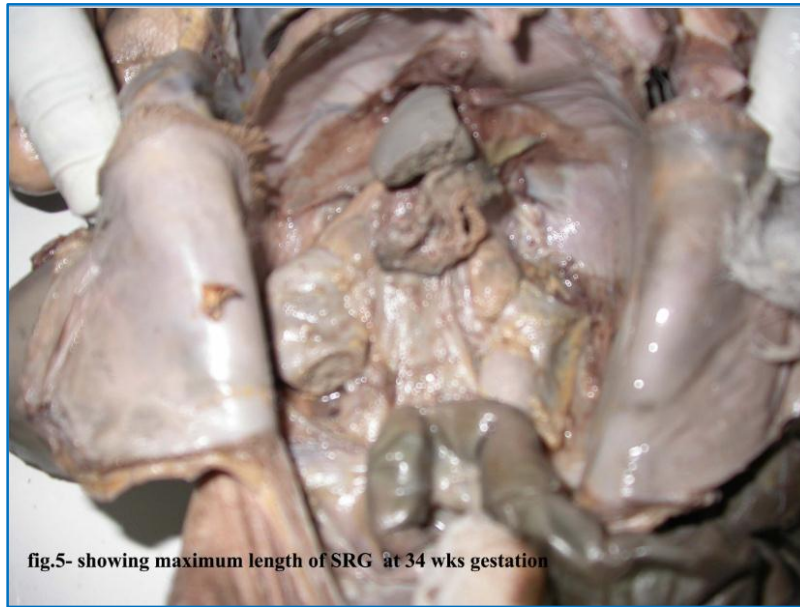


fig.5- showing maximum length of SRG at 34 wks gestation

Fig. 7: Showing Maximum length of SRG at 34wks gestation

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