61

A study on morphological and histological changes of suprarenal gland at various stages of development

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Aims and objectives: The fetal suprarenals are large glands due to the extensive development of the provisional cortex which comprises 80% of the fetal suprarenal gland. Carr and Casey (1982) reported that there is a rapid increase in adrenal weight after 12 weeks of gestation. Therefore, the study was undertaken on the supra renal gland morphology and histological changes between 3rd and 6th months of embryonic development.

Material and methods: Right and left suprarenals in 16 human fetuses aged between 9 and 24 weeks were used for study. The capsule, cortex and medulla were studied qualitatively and by morphometry on the H&E stained histological sections.

Results: In the 9th week fetus, suprarenal glands were identifiable as tongue shaped pale coloured masses while the regular shape attained by 18th week. There was a gradual steady increase in the measurements of length, thickness, breadth and weight with increasing gestational age. Capsule was identifiable by 12 weeks and increased in thickness with increasing gestational age. The adult cortex which is definitive cortex, was subcapsular in position with small basophilic cells. The fetal cortex was towards medulla with large eosinophilic cells. The adult cortex found to occupy 1/4th of the cortex while fetal cortex the remaining 3/4th. By 24 weeks, the fetal cortex became bulkier and measured 4/5th while adult cortex measured 1/5th. Medulla was ill defined by 12 weeks of age and became well defined and distinct with the presence of blood vessels by 24 weeks.

Conflicts of interest

The authors have none to declare.

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62

Expression of brain derived growth factor (BDNF) in hippocampus of mid gestational human fetuses

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Aims and objectives: In the present study an attempt was made to observe the expression of BDNF in the developing hippocampus of mid gestational human fetuses. BDNF is a sub member of neurotrophin family and is a critical regulator of formation and plasticity of neuronal networks in hippocampal formation. It acts in the activity dependent manner and its expression is highly sensitive to developmental and environmental factors.

Material and methods: In present study 10 aborted fetuses from 14 to 30 weeks of gestation were procured from the department of obstetrics and gynecology, LN hospital after obtaining ethical clearance. For each gestational age the tissue was stained with cresyl violet and H&E to see the general morphology of hippocampus and immunostaining of the selected sections of different age groups was done for the expression of BDNF.

Results: Subparts of hippocampus including Ammons horn, subiculum and dentate gyrus were identified in all age groups and immunostaining was detected in both cell bodies and fibers. Expression of BDNF was more marked in the hippocampus of higher gestational age groups as compared to lower ones.

Conclusion: Increased expression of BDNF in higher gestational age groups shows that neurotrophic factors like BDNF influences the neuronal differentiation and development. Expression profile of BDNF will help in better understanding of pathophysiology of various neurobiological disorders like schizophrenia, Alzheimer's and depression.

Conflicts of interest

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63

Role of angiogenic factors in inducing endoplasmic reticulum stress in trophoblast: An in vitro study

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Aims and objectives: Preeclampsia, the *de novo* occurrence of hypertension and proteinuria after the 12th week of gestation is characterised by a defect in vascular remodelling, placental malperfusion, peripheral vasoconstriction, and a systemic anti-angiogenic response. Evidence suggests that the soluble form of the receptor, vascular endothelial growth factor receptor-1 (sVEGFR-1/sFlt1-1), is produced in excess by the placenta of women with preeclampsia in first trimester thereby reducing vascular endothelial growth factor (VEGF) bioavailability leading to hypoxia and oxidative stress in placental cells. The present study was planned to determine whether the imbalance in these circulating angiogenic factors can also lead to endoplasmic reticulum stress in trophoblast cells.

Material and methods: Blood sample was collected from 30 preeclamptic and 30 normotensive controls after Institute ethics committee approval and informed consent from subjects. The human choriocarcinoma cell line (BeWo) was procured from ATCC and was cultured with (i) preeclamptic sera (ii) normotensive sera (iii) preeclamptic sera with recombinant VEGF and (iv) normotensive sera with recombinant sFlt-1. Endoplasmic reticulum stress was observed by the presence of GRP78 using immunofluorescence.

Results: The GRP78 immunofluroescence was significantly higher in BeWo cells treated with preeclamptic sera as compared to the BeWo cells treated with control sera ($p < 0.05$). This effect was reversed when BeWo cells were treated with preeclamptic sera along with recombinant VEGF and BeWo cells treated with control sera after the addition of recombinant sFlt-1.

Conclusion: Altered serum levels of VEGF and sFlt-1 may induce the endoplasmic reticulum stress in trophoblast cell lines (BeWo) suggesting a role for circulating angiogenic factors in the pathogenesis of preeclampsia.

Conflicts of interest

The authors have none to declare.

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64

Hepatotoxicity of valproate on fetal mice liver

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Aims and objectives: Valproic acid is an antiepileptic drug. It acts by elevating GABA level in the CNS. It exerts therapeutic effects in a broad range of seizure (tonic–clonic, myoclonic, absence, partial) and bipolar disorder.

Material and methods: The present work was carried out in the Department of Anatomy, IMS, BHU, Varanasi to evaluate the cytotoxic effect of valproate on fetal mice liver. Pregnant mice were exposed to single dose (8th gestational day) and multiple dose (7th, 8th, 9th gestational day) of sodium valproate (200 mg/kg dose) intraperitoneally and fetuses were collected on 18th gestational day.

Results: The liver was smaller in size in valproate treated groups. Histologically, liver showed dilated central vein, breakage of endothelial lining of central vein, edema and extracellular matrix deposition around central vein. In the multiple treated groups, the liver cell nuclei were visible but cell outline was lost. Some of cells showing perinuclear condensation suggesting programmed cell death.

Conclusion: Valproate was found teratogenic at 200 mg/kg dose in mice fetus.

Conflicts of interest

The authors have none to declare.

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65

Development of spleen in intrauterine life

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Aims and objectives: The present study is an attempt to find out variations in morphometry of fetal spleen at different gestational ages (14th–40th weeks).

Material and methods: Study was conducted on 24 fetus (14 male, 10 female) preserved in formalin. Fetuses were procured from Dr Sushila Tiwari Hospital, Haldwani, with permission from ethical committee. They were arranged in 3 groups – 1 (12–34 weeks); 2 (25–36 weeks) and 3 (>36 weeks). Parameters of spleen like length, breadth, thickness were measured by digital vernier calipers and weight was recorded by weighing scale. Results were documented and subjected to statistical analysis.

Results: The mean length (*L*), breadth (*B*), thickness (*T*), weight (*W*) of spleen in group 1 was 1.52 cm (*L*), 0.92 cm (*B*), 0.58 cm (*T*), 0.736 g (*W*). In group 2 was 2.80 cm (*L*), 1.94 cm (*B*), 1.04 cm (*T*), 3.557 g (*W*). In group 3 was 3.62 cm (*L*), 2.40 cm (*B*), 1.21 cm (*T*), 6.688 g (*W*). These parameters showed statistically significant correlation with increasing gestational age. The percentage ratio of spleen to fetal weight in group 1, 2, 3 was 0.147%, 0.258%, 0.285% respectively.

Conclusion: The present study showed an increasing trend in mean parameters of fetal spleen with increasing gestational age. Spleen belongs to reticuloendothelial system and performs both immunological and haematological functions. Splenic development is useful for determining its morphological study.

Conflicts of interest

The authors have none to declare.

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66

Morphological study of foetal kidney length in relation to gestational age

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Aims and objectives: A true estimation of gestational age plays an important role in quality maternity care and scheduling the labour date. This study aimed to evaluate the normal fetal kidney length in relation to gestational age.

Material and methods: The study was done on 65 foetuses (male 36 and female 29) does not having any congenital anomalies were collected from Dr. Sushila Tiwari Memorial Hospital, Haldwani with due regards on ethical ground. After that all foetuses are preserved in 10% formalin. The measurements of both kidneys were taken from digital vernier caliper. Data were collected in three groups of gestational age G1 (10–20 weeks), G2 (20–30 weeks) and G3 (30–40 weeks).

Results: In all three groups the mean length of right kidney (cm) is 1.39, 2.37, and 3.73 while mean length of left kidney is 1.51, 2.53, and 3.83 respectively. The study established a significant and positive correlation ($p = <0.000$) between the length of kidneys and gestational age. But there is no significant relation is found between kidney length in male and female foetuses. Maximum increase in kidney length was observed from group G2 to G3 (20–40 weeks).

Conclusion: The present data showed a normal range of fetal kidney length from early stages to full term of gestation. It may be useful in intrauterine assessment of development and early prenatal diagnosis of renal abnormalities.

Conflicts of interest

The authors have none to declare.

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67

Variations of abdominal aorta and its branches in fetuses of Manipur

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Aims and objectives: Abdominal aorta gives different branches to supply oxygenated blood to all the important organs in the abdominal cavity. Variations of abdominal aorta and its