

**Results:** Circle of Willis with duplications e.g., of anterior communicating artery, oblique anterior communicating artery, fenestrations' abnormal origins and terminations, etc. were found.

**Conclusion:** Variations are common in the circle of Willis and this knowledge would be helpful to neurosurgeons, vascular surgeons, etc.

## 28. Weight and volume of the thyroid gland in north Indian population

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**Objective:** This study was done to find out the changes in the weight and volume of the thyroid gland in different age groups. The age groups are Group A – up to 20 years, Group B – 21–50 years and Group C – above 50 years.

**Methods:** The study was conducted on 60 human thyroid glands in the Department of Anatomy in collaboration with department of Forensic Medicine, Pt. B.D. Sharma Post Graduate Institute of Medical Sciences, Rohtak in North Indian population. The weight was measured by digital weighing balance and the volume was measured by water displacement method.

**Results:** The study revealed that the mean weight of the thyroid gland was found to be in Group A as  $10.11 \pm 3.90$  g, Group B as  $15.25 \pm 4.05$  g and Group C as  $12.95 \pm 2.89$  g. The mean volume of the thyroid gland was found to be in Group A as  $9.42 \pm 3.43$  ml, in Group B as  $14.23 \pm 3.41$  ml and in Group C as  $11.70 \pm 2.49$  ml.

**Conclusion:** The study concluded that the mean weight and volume of the thyroid gland was found to be higher in Group B (21–50 years) followed by Group C (above 50 years) and then followed by Group A (below 20 years).

## 29. Anatomy of prostate of adults in Manipur

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**Objectives:** To assess the normal dimensions and volume of prostate to form a baseline reference value of healthy adult Manipuri subjects and to delineate the normal and borderline cases from the benign prostatic hyperplasia (BPH) by ultrasonography.

**Materials and Methods:** The present study was carried out in 208 individuals, age ranging from 21 to 80 years, who attended the Radiology department, Regional Institute of Medical Sciences, Imphal, Manipur, for abdominal ultrasonography. Permission from the concerned authority and approval from the Institutional Ethics Committee were taken prior to the study. Informed consent was also obtained from the participants. Prostate dimensions were measured by using the model Medison SONOACE X8 ultrasound machine with a curvilinear 3.5MHz transducer. Volume of prostate was

calculated by using the prolate ellipsoid formula:

$$\text{Prostate volume} = (\text{anteroposterior diameter} \\ \times \text{transverse diameter} \\ \times \text{vertical diameter}) \times \frac{\pi}{6}.$$

**Results and Observations:** There were 162 healthy adults and 46 BPH cases. The mean age, mean weight, mean height and mean BMI were 47.56 years ( $\pm 14.50$  SD), 60.69 kg ( $\pm 5.47$  SD), 164.03 cm ( $\pm 5.61$  SD) and  $22.54 \text{ kg/m}^2$  ( $\pm 1.42$  SD), respectively. Mean prostate volume was 16.53 ml ( $\pm 5.06$  SD) for healthy prostates and 43.15 ml ( $\pm 13.51$  SD) was the mean volume for BPH cases.

**Conclusion:** The present study shows that total prostate volume has a strong significant relationship with age. Our study will provide the dimensions and volume of prostate for the Manipuri people, which will be useful in assessing this organ for any pathological enlargement or reduction in clinical practice.

## 30. Ethical & legal issues in medical genetics

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**Background:** Ethical issues in human genetics pose more challenges because genetic identity impinges not only on the individual but also on the extended family and society in general. The fundamental ethical principles of autonomy, beneficence, non-maleficence and justice are not full proof because limitations arise due to apparent conflicts between the principles. Hence an acceptable ethical framework needs to be worked out that can balance the principles one against another.

**Practical Approach to Ethics in Medical Genetics:** Ethical issues need to be considered if the benefits are maximised and the harms minimised from the increasing ability to use genetic testing to analyse an individual's genetic information. The ethical issues generally arise from: *The shared nature and ownership of genetic information.* The doctor's ethical responsibilities include balancing the privacy and confidentiality of the individual and prevention of harm to others. In patients of balanced translocations and X-linked recessive disorders, confidentiality cannot be limited to the patient and close family relatives must understand carrier status (that they could be also carriers) and therefore the risk of having a affected baby. *Limitations of genetic testing.* The genetic tests are diagnostic (prenatal and newborn screening) and predictive (for late-onset dominant autosomal disorders). Treatment options are limited for genetic disorders, and moreover, these diagnostic tests cannot predict the severity and the age of onset of the disease. To inform a child about adult-onset dominant autosomal disorders will be unethical as it leads to social discrimination and should ideally be postponed till the child reaches the age of consent. The prenatal and screening tests should aim to provide maximum information to the patient so that they can make an "informed choice" of having a baby.