

Measurement Of Adrenal Gland Width On Computed Tomography- A Cross Sectional Study In 1000 People Of Different Age Groups

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I. Introduction

The adrenal glands, critical for hormone secretion and metabolic regulation, face morphological changes in diseases. Advanced CT technology improves size assessment, yet data gaps exist, especially for Indian adults. A study aims to fill this by detailing adrenal gland dimensions with 128-slice CT, enhancing diagnostic accuracy and clinical outcomes.

AIM: To calculate the size of adrenal glands in adult patients reporting for CT abdomen without any clinical evidence of diseases related to adrenals.

OBJECTIVES: To accurately measure the size of normal adrenal glands in Indian adults using 128- slice multidetector CT, enhancing the understanding of adrenal morphology and aiding in the diagnosis and evaluation of adrenal diseases within this population.

II. Materials And Method

STUDY AREA- The study has been conducted at Sharda Hospital, Greater Noida in the Department of Radiodiagnosis. The study includes 1000 consecutive adult patients without any clinical history of diseases affecting adrenal gland and referred by various departments, for NCCT evaluation of abdomen, to Department of Radiodiagnosis, Sharda Hospital, Greater Noida .

METHOD OF COLLECTION OF DATA: Clinical data including date and pattern of onset of present illness, was collected from the patients. The patients underwent CECT/NCCT of KUB or Abdomen.

This study included a total of 1000 participants, and they all underwent imaging for various reasons.

Study procedure- After approval from the Institutional Ethical committee, all the subjects were selected according to the inclusion and exclusion criteria. A detailed history and routine and appropriate investigations were done in all patients.

METHODS- CT was performed using 128 SLICED CT OPTIMA WIPRO GE HEALTHCARE. A slice thickness of 5mm, kVp of 120 kv and 299 mAs was used in all scans. Images were viewed in all 3 planes simultaneously on AW Volume Share 7 Workstation. Noncontrast scan was followed by contrast enhanced study in few of the patients.

STATISTICAL ANALYSIS -For continuous variables, mean and SD was calculated (descriptive statistics). They were represented as percentages and frequency. The data was entered into SPSS (statistical package for social sciences) v251.0 and Med Calcoftware.

The χ^2 -static follows a two-variable distribution with degrees of freedom as $(r-1) \times (C1)$, where 'r' is the number of rows and 'c' is the number of columns in the tabulated data. Where Σ , signifies summation and Expected frequencies Row total Column Total Grand total. To determine the level of significance, the estimated value is then contrasted with the theoretical value of the 2 distribution for the specified degree of freedom.

III. Results

Reveals that 461 participants (46.1%) were female, while 539 individuals (53.9%) were male.

That the medial limb of the right adrenal gland, the mean was 3.8643 (SD = 0.16100), with a minimum of 3.30 and a maximum of 4.50. For the lateral limb, the mean was 3.9768 (SD = 0.12048), with a minimum of 3.40 and a maximum of 4.50. For the body, the mean was 7.112 (SD = 0.2235), with a minimum of 6.7 and a maximum of 7.6

Table 3: Distribution of size of right adrenal gland

Right Adrenal Gland			
	MEDIAL LIMB (Right Adrenal)	LATERAL LIMB (Right Adrenal)	BODY (right Adrenal)
Mean	3.8643	3.9768	7.112
Std. Deviation	0.16100	0.12048	0.2235
Minimum	3.30	3.40	6.7
Maximum	4.50	4.50	7.6

That the medial limb of the left adrenal gland, the mean was 4.2770 (SD = 0.17990), with a minimum of 3.70 and a maximum of 4.50. For the lateral limb, the mean was 4.3250 (SD = 0.17101), with a minimum of 3.60 and a maximum of 4.60. For the body, the mean was 7.5224 (SD = 0.28813), with a minimum of 6.50 and a maximum of 8.40.

Table 4: Distribution of size of left adrenal gland

Left Adrenal Gland			
	MEDIAL LIMB (left Adrenal)	LATERAL LIMB (left Adrenal)	BODY (left Adrenal)
Mean	4.2770	4.3250	7.5224
Std. Deviation	0.17990	0.17101	0.28813
Minimum	3.70	3.60	6.50
Maximum	4.80	4.60	8.40

Table 5: Distribution of size of right adrenal gland among females

Among Females (Right Adrenal Gland)			
	MEDIAL LIMB (Right Adrenal)	LATERAL LIMB (Right Adrenal)	BODY (right Adrenal)
Mean	3.8818	3.9831	7.104
Std. Deviation	0.16568	0.11636	0.2180
Minimum	3.30	3.40	6.7
Maximum	4.30	4.30	7.6

Table 6: Distribution of size of left adrenal gland among females

Among females (Left Adrenal Gland)			
	MEDIAL LIMB (left Adrenal)	LATERAL LIMB (left Adrenal)	BODY (left Adrenal)
Mean	4.2761	4.3401	7.5249
Std. Deviation	0.18092	0.17537	0.29841
Minimum	3.70	3.60	6.50
Maximum	4.50	4.50	8.40

Table 7: Distribution of size of right adrenal gland among males

Among males (Right Adrenal Gland)			
	MEDIAL LIMB (Right Adrenal)	LATERAL LIMB (Right Adrenal)	BODY (right Adrenal)
Mean	3.8494	3.9714	7.119
Std. Deviation	0.15549	0.12376	0.2280
Minimum	3.50	3.60	6.8
Maximum	4.50	4.50	7.6

Table 8: Distribution of size of left adrenal gland among males

Among males (Left Adrenal Gland)			
	MEDIAL LIMB (left Adrenal)	LATERAL LIMB (left Adrenal)	BODY (left Adrenal)
Mean	4.2777	4.3121	7.5202
Std. Deviation	0.17918	0.16626	0.27930
Minimum	3.90	3.60	6.90
Maximum	4.80	4.60	8.40

IV. Discussion

The present study represents a significant contribution to the understanding of adrenal gland anatomy within the Indian population, a context where such data have been notably sparse. This research is particularly novel because it addresses a gap in the demographic representation of Indian individuals in adrenal gland studies, offering new insights that are essential for both clinical and educational purposes in endocrinology. The adrenal glands, positioned adjacent to the kidneys, are integral components of the human endocrine system, comprising the outer cortex and the inner medulla. These structures are responsible for the secretion of crucial hormones like cortisol, aldosterone, androgens, epinephrine, and norepinephrine. The present study's focus on the dimensions of these glands across a broad age and gender spectrum provides a foundation for better understanding how these dimensions may correlate with physiological or pathological states.

Age Distribution: The present study had participants with a mean age of 39.66 years, spanning a wide age range from 15 to 80 years. This broad age range allows for the examination of adrenal gland measurements across a diverse age group, potentially capturing age-related changes in adrenal anatomy.

Gender Distribution: The gender distribution in the present study was nearly balanced, with 461 females (46.1%) and 539 males (53.9%). This gender representation is crucial for exploring potential sex-based differences in adrenal gland anatomy and function.

Right Adrenal Gland: The present study showed that the right adrenal gland's medial limb had a mean thickness of 3.8643 mm with a standard deviation of 0.16100 mm, and it ranged from 3.30 mm to 4.50 mm. The lateral limb reported a mean thickness of 3.9768 mm, SD = 0.12048 mm, with a range from 3.40 mm to 4.50 mm. The

body of the right gland measured a mean thickness of 7.112 mm, SD = 0.2235 mm, ranging 30 from 6.7 mm to 7.6 mm.

Left Adrenal Gland: Similarly, for the left adrenal gland, the present study found the medial limb's mean thickness to be 4.2770 mm, SD = 0.17990 mm, ranging from 3.70 mm to 4.50 mm. The lateral limb had a mean of 4.3250 mm, SD = 0.17101 mm, with a range from 3.60 mm to 4.60 mm. The body's thickness was notably higher at 7.5224 mm, SD = 0.28813 mm, with a range from 6.50 mm to 8.40 mm.

For the right adrenal gland, the present study indicated that males had a medial limb mean thickness of 3.8494 mm (SD = 0.15549 mm) and a lateral limb mean thickness of 3.9714 mm (SD = 0.12376 mm), with the body measuring a mean thickness of 7.119 mm (SD = 0.2280 mm). Females displayed a slightly higher medial limb mean thickness of 3.8818 mm (SD = 0.16568 mm) and a lateral limb mean thickness of 3.9831 mm (SD = 0.11636 mm), but the body's mean thickness was marginally lower at 7.104 mm (SD = 0.2180 mm). These subtle variations between genders in the right adrenal gland's dimensions are insightful but not as pronounced as might be expected based on prior studies.

Similarly, for the left adrenal gland, males reported a medial limb mean thickness of 4.2777 mm (SD = 0.17918 mm) and a lateral limb mean thickness of 4.3121 mm (SD = 0.16626 mm), with the body measuring a mean thickness of 7.5202 mm (SD = 0.27930 mm). In contrast, females had nearly equivalent medial limb thickness at 4.2761 mm (SD = 0.18092 mm).

V. Conclusion

Key findings include the mean thickness measurements of the right and left adrenal glands. For the right adrenal gland, the medial limb averaged 3.8643 mm, the lateral limb 3.9768 mm, and the body 7.112 mm. For the left adrenal gland, the medial limb averaged 4.2770 mm, the lateral limb 4.3250 mm, and the body 7.5224 mm. These dimensions highlight potential ethnic or methodological differences when compared to other studies.

In conclusion, this study provides valuable insights into adrenal gland anatomy in the Indian population, enhancing the understanding necessary for accurate clinical assessment and treatment of adrenal disorders