



A Retrospective Determination of the Average Testicular Volume of Pubertal and Post-pubertal Male Patients in a Tertiary Institution

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ABSTRACT

Testicular size is an important determinant of sexual maturity in males. We determined the average testicular volume of patients in different age groups who underwent scrotal ultrasonography in our institution.

A database search was performed using the SoliPacs system from January 2016 to October 2020. A total of 769 patients fulfilled the search criteria. A total of 1354 testes were included in the study.

Testicular size begins increasing in size after the age of 10, around 1.9 ml, reaching adult size (15.1 ml) at 17 years of age. The average testicular size, around 17 ml, remains the same throughout adulthood (17 to 60 years of age) and begins to decline during senescence (>60 years of age).

This descriptive survey aims to pilot a study that will ultimately estimate the average testicular size among Filipino men. Values determined across age groups is useful in determining the sexual maturity and fertility potential in asymptomatic patients.



Figure 1. Average testicular volume across age groups during puberty (above) and across adulthood to senescence (below).

RESULTS

A total of 769 patients, 1354 testes were included in the study. Testes with abnormal findings in 184 patients were excluded. The results show that the average testicular size of Filipinos is slightly smaller than other races with previous similar studies (17.6 ml in Japanese men and 24.9 ml in New Yorkers)¹.

The results in Figure 1, show that testicular volume begins increasing at the onset of puberty and reaches plateau during adulthood. Testicular volume eventually decreases in size during senescence. In addition, across age groups post-puberty, it was seen that the mean testicular volume measured was, on average, higher for the right testicle than the left (17.1 ml and 16.7 ml, respectively).

INTRODUCTION

Seminiferous tubules comprise more than 90% of testicular mass, thus, it is understood that testicular volume reflects spermatogenesis and male fertility^{1, 2}. Consequently, measurement of testicular volume is considered an important instrument in the assessment of a patient's sexual maturity^{1, 2, 3, 4}. In addition, it has been shown that testicular volume indirectly correlates well with semen profiles in infertile men⁴.

Studies have been shown that measuring the several axes of the testis via ultrasonography best estimates testicular size^{6, 7, 8, 9}. Moreover, a recent study in dogs determined that the formula length (L) x width (W) x height (H) x 0.71 best estimates testicular volume¹¹.

We aim to determine the average testicular volume among pubertal and post-pubertal patients who came in for ultrasonography in a tertiary institution.

MATERIALS AND METHODOLOGY

A database search in our institution has been performed from March 2016 to October 2020 using the SoliPacs System. Ultrasound reports that included a testicular study were included. Testes with abnormal findings and ultrasound reports with incomplete data were both excluded.

The axes measurements were tabulated in terms of length, width and height. The testicular volume is calculated using the formula: length x width x height x 0.71. The range and mean values of each measurement was determined per age group: 10 to 17 years, 17 to 30 years, 30 to 60 years, 60 to 80 years, 80 years and above.

DISCUSSION AND CONCLUSION

Testicular volume is deemed to be an important basis for male reproductive health and function^{1, 2, 3, 4}. During puberty and adolescence, it is important to evaluate testicular growth for age appropriateness and symmetry by using testicular volume⁵.

From newborn years to puberty, there is very little increase in testicular size. It is generally accepted that testicular volume enlargement of more than 4 cm³ is the clinical landmark for onset of puberty^{5, 12}. The adult testicular size is then reached at around 17 to 18 years of age. Testicular volume is unchanged throughout adulthood until the age of senescence, around 70 to 80 years old, after which the testes purportedly decreases in size¹³. The results in our study corroborates these statements from reviewed literature.

Testicular volume variations by race determined in previous studies reinforces the necessity in determining a country-specific value for normal-sized adult testes in our region¹.

The data obtained in this study presents the average testicular volume of Filipino male patients who underwent scrotal ultrasonography in our institution. This roughly estimates the normal testicular size across different age groups.

However, the varying number of samples per age group could potentially decrease accuracy in this estimation.

Ultimately, accurate determination of testicular volume, significantly contributes to the evaluation of patients with a variety of disorders affecting testicular growth and function.

REFERENCES

- [1] Takhira, H et al. Significance of testicular size measurement in andrology. I. A new orchimeter and its clinical application. 1983. Fertility and Sterility 39 (6): 836-840
- [2] Sakamoto, H et al. Testicular Volume Measurements using Prader Orchidometer Versus Ultrasonography in Patients with Infertility. 2007. UROLOGY. 69: 158-162
- [3] Tijani, KH et al. Assessment of testicular volume: A comparison of fertile and sub-fertile West African men. 2014. African Journal of Urology. 20 (3): 136-140
- [4] Lenz S. et al. Ultrasonic testicular texture and size in 444 men from the general population: correlation to semen quality. 1993. Eur Urol 1993 (24): 231-238
- [5] Chipkevitch. Clinical assessment of sexual maturation in adolescents. 2001. Jornal de Pediatria. 77 (Supl 2): S136-S142
- [6] Diamond DA et al. Comparative assessment of pediatric testicular volume: orchidometer versus ultrasound. 2000. The Journal of Urology. 163 (3): 1111-1114
- [7] Anyanwu LC et al. Testicular volume: correlation of ultrasonography, orchidometer and caliper measurements in children. 2020. African Journal of Urology. 26 (6)
- [8] Salim A et al. Evaluation of testicular volume by three orchidometers compared with ultrasonographic measurements. 1995. Brit Jour Urol. 76 (5): 632-635
- [9] Taskinen, S et al. Measurement of testicular volume: comparison of 3 different methods. 1996. The Journal of Urology. 155: 930-933
- [10] Shiraishi et al. Usefulness and limitation of punched-out orchidometer in testicular volume measurement. 2005. Asian J Androl. 2005. 7 (1): 77-80
- [11] Paltiel H et al. Testicular volume: comparison of orchidometer and US measurements in dogs. 2002. Radiology 222:114-119
- [12] Emmanuel M, Bokor BR. Tanner Stages. In: StatPearls. Treasure Island (FL): StatPearls Publishing; 2020
- [13] Handelsman DJ et al. Testicular size: the effects of aging, malnutrition, and illness. 1985. J Androl. 6 (3): 144-151