



A STUDY OF THE CORRELATION OF THE LENGTH OF ESOPHAGUS WITH EXTERNAL BODY PARAMETERS IN A SOUTH INDIAN POPULATION

Gastroenterology

**Dr. P. Ratnakar
Kini**

Associate Professor, Institute of Medical Gastroenterology, Madras Medical College and Rajiv Gandhi Government General Hospital, Chennai.

ABSTRACT

Introduction: Assessing the length of the esophagus is important for various clinical applications like placing a nasogastric tube, placing a pH catheter, placing a manometry catheter and for placing prosthesis for esophageal stricture and for colonic interposition surgery. The length of the esophagus varies according to race, age and gender in normal individuals. The length also depends on various disease conditions. There are no studies done correlating the length of the esophagus with external body parameters in the South Indian Population. The aim of this study was to determine whether there is a correlation between esophageal length and an individual's parameters such as height, weight, body mass index and also gender in the South Indian Population. **Materials And Methods:** This is a prospective study conducted in the Department of Medical Gastroenterology, Government Mohan Kumaramangalam Medical College Hospital, Salem, India from April 2022 to June 2022. Subjects who underwent gastroscopy were randomly chosen. Those who had structural diseases involving the esophagus were excluded from the study. The weight, height and body mass index were measured. The distance of the upper esophageal and the proximal margin of the lower esophageal sphincters from the incisor teeth were measured and the difference between the two was taken as the length of the esophagus. The data was then analyzed using the student's t test for comparing the means. Correlation of the esophageal body length with various parameters was done using a Pearson's correlation test. **Results:** A total of 125 subjects were included in the study. Of these, 81 were males (65%) and 44 were females (35%). The mean height of the subjects was 1.61. The average weight was 55.96. The average BMI was 21. The mean esophageal length was 22.54 cm. The average length of the esophagus in the males was 23.16 cm and in the females it was 21.41 cm. **Conclusion:** The height of the individual correlates well with the height of the individual in the South Indian Population. There is no correlation between the length of the esophagus with the weight and BMI of the individual.

KEYWORDS

INTRODUCTION

Assessing the length of the esophagus is important for various clinical applications like placing a nasogastric tube, placing a pH catheter, placing a manometry catheter and for placing prosthesis for esophageal stricture and for colonic interposition surgery¹.

The length of the esophagus varies according to race, age and gender in normal individuals¹. The length also depends on various disease conditions. There are no studies done correlating the length of the esophagus with external body parameters in the South Indian Population.

Similar studies done in other populations have shown the best correlation of the length of the esophagus is with the height of the individual.

The aim of this study was to determine whether there is a correlation between esophageal length and an individual's parameters such as height, weight, body mass index and also gender in the South Indian Population.

MATERIALS AND METHODS -

This is a prospective study conducted in the Department of Medical Gastroenterology, Government Mohan Kumaramangalam Medical College Hospital, Salem, India from April 2022 to June 2022.

Subjects who underwent gastroscopy were randomly chosen. Those who had structural diseases involving the esophagus were excluded from the study. The weight, height and body mass index were measured.

The distance of the upper esophageal and the proximal margin of the lower esophageal sphincters from the incisor teeth were measured and the difference between the two was taken as the length of the esophagus.

The data was then analyzed using the student's t test for comparing the means. Correlation of the esophageal body length with various parameters was done using a Pearson's correlation test.

RESULTS

A total of 125 subjects were included in the study. Of these, 81 were males (65%) and 44 were females (35%).

The mean height of the subjects was 1.61 m. The average weight was

55.96. The average BMI was 21. The mean esophageal length was 22.54 cm. The average length of the esophagus in the males was 23.16 cm and in the females it was 21.41 cm.

Correlation Between The Length Of The Esophagus And The Gender

Table 1	Body Parameters	
	Mean	Standard Deviation
Height in m	1.61	0.1
Weight in kg	55.96	13
Body mass index	22	4.67
Length of the esophagus in cm	22.54	2.75

The length of the esophagus in the males was longer than in females. The mean length of esophagus in males was 23.16 cm whereas in the females the mean length of the esophagus was 21.41 cm. The p is less than 0.05 and is statistically significant

Correlation between the length of the esophagus and the weight, height and BMI

Table 2	Parameters in males and females	
	Males	Females
Height in m	1.66	1.53
Weight in kg	57.8	52.43
BMI	21.05	22.4
Length of the esophagus	23.16	21.41

There was no linear correlation between length of the esophagus and body weight with the correlation coefficient of 0. There was a positive correlation between the length of the esophagus and the body height with the correlation coefficient of 0.3. There was no linear correlation between the length of the esophagus and body mass index.

DISCUSSION

The esophagus is a hollow muscular tube 18-26 cm long with an inner lining of stratified squamous epithelium². It starts from the cricopharyngeal sphincter and ends in the lower esophageal sphincter. The upper one third is composed exclusively of skeletal muscle and the lower 50% is composed entirely of smooth muscle².

Esophagus acts as a conduit to transport food from the oral cavity to the stomach. The transport is facilitated by primary and secondary peristalsis.

In a study done by Li et al in adults, the average esophageal length to be

22.9 +/- 0.2 cm in subjects without disease³. In this study, the length of the esophagus was measured during endoscopy by measuring the difference between the distance of the high pressure upper esophageal sphincter and the proximal margin of the lower esophageal sphincter.

In another study done by Awad et al, the average length of the esophagus was 28.3 +/- 2.41 cm⁴. This study was also done by measuring the length of the esophagus during endoscopy by measuring the difference between the proximal end of the upper esophageal sphincter and the distal end of the lower esophageal sphincter.

In another study done by Yau et al, the length of the esophagus was measured manometrically. The average length of the esophagus was found to be 23 cm⁵.

In the studies done in cadavers, the average length of the esophagus was about 25 cm⁶.

In our study, the average length of the esophagus was found to be 22.36 +/- 3.41. Our study showed the average length of the esophagus closer to the values shown in the study done by Li et al and Yau et al. So measuring the length of the esophagus using the landmarks of the upper esophageal sphincter and the proximal margin of the lower esophageal sphincter should be considered. Where facilities are available, the length of the esophagus can be measured manometrically.

In the study done by Awad et al, there was no correlation between the gender and length of the esophagus. In studies done by Scapa et al and Li et al, the average length of the esophagus was longer in males compared to that in females. In our study, the findings were similar, showing a longer esophagus in males than in females. In our study, the average length of esophagus in males was 22.88 cm and the average length of esophagus in females was 21.41 cm.

None of the studies showed any correlation between the weight of the individual and the length of the esophagus. Our study also did not show any correlation between the weight of the individual and the length of the esophagus. Similarly none of the study showed any correlation between the body mass index and the length of the esophagus. Our study also showed a similar finding.

In most of the studies, the length of the esophagus correlated with the height of the individual. In our study also, the length of the esophagus correlated with the height of the individual.

CONCLUSION

The height of the individual correlates well with the height of the individual in the South Indian Population. There is no correlation between the length of the esophagus with the weight and BMI of the individual.

REFERENCES

1. Song, T. J.; Kim, Y. H.; Ryu, H. S. & Hyun, J. H. Correlation of esophageal lengths with measurable external parameters. Korean J. Intern. Med., 6(1):16-20, 1991.
2. The normal anatomy of the esophagus. In: Fenoglio-Preiser CM, editor. Gastrointestinal pathology. An atlas and text. 2nd ed. Philadelphia: Lippincott-Raven; 1999. p 15-29.
3. Li, Q.; Castell, J. A. & Castell, D. O. Manometric determination of esophageal length. Am. J. Gastroenterol., 89(5):722-5, 1994.
4. Awad, Z. T.; Watson, P.; Filipi, C. J.; Marsh, R. E.; Tomonaga, T.; Shiino, Y.; Bhatia, S. & Boedefeld, W. 3rd. Correlations between esophageal diseases and manometric length: a study of 617 patients. J. Gastrointest. Surg., 3(5):483-8, 1999.
5. Yau, P.; Watson, D. I.; Jamieson, G. G.; Myers, J. & Ascott, N. The influence of esophageal length on outcomes after laparoscopic fundoplication. J. Am. Coll. Surg., 191(4):360-5, 2000.
6. Bannister, L. H. The Gastrointestinal tract, in Gray's Anatomy. 38th edition. Edinburgh, Churchill Livingstone, 2000. p.1751.