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Original Research Paper

Study of Morphology of Trachea in Different Age Groups of Maharashtrian Population

Medical Science

KEYWORDS : Trachea, Length, adult male.

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ABSTRACT

Anatomical knowledge about length of trachea is essential for anesthetists, surgeons, radiologists. In anesthetic procedure, the knowledge of the length of trachea helps to select correct sizes of endo-tracheal tubes. 94 trachea of Maharashtrian adult male, age ranged from 21 to 58 years within 24 hours after death which were autopsied in the Department of Forensic Medicine of Grant Medical College, Mumbai. The collected samples were divided into four age groups, ranged from 20 to 59 years and comparative studies were done between different age groups.The length of trachea increased with advancing age. The values showed positive correlation with age & statistically it was highly significant (P<0.001). In the present study the length of the trachea increased with the increasing age. This study is useful for the anatomists, forensic experts, anesthetists and surgeons.

INTRODUCTION:

The trachea is a tube of cartilage and fibro-muscular membrane; about 12-15 cms long & extends from the sixth cervical vertebra to the upper border of fifth thoracic vertebra1. The length varies with age2. It splits into right & left main principal bronchi which enter the respective lungs & progressively branch off throughout the entire organ, the tracheo-bronchial tree[3]. The tracheo-bronchial tree is the essential part of respiratory tract. It serves as a tubular system for conducting air into & out of the alveoli of lung. In addition, it participates in humidification, temperature adjustment & elimination of air born pollutants of inspired air4. Anatomical knowledge about the length of trachea is essential for anesthetists for selecting anatomically designed cuff for endo-tracheal intubation5. The present study was planned to establish our standard data and to compare the data with that of other countries.

MATERIALS AND METHODS:

94 tracheas of Indian adult males of different ages were selected for the present study. The samples were collected from unclaimed dead bodies autopsied in the Department of Forensic of Medical Colleges within 12 to 36 hours of death. The samples were washed gently & thoroughly with running tap water & tagged properly bearing an identification number & age of the cadaver. Then these were kept in 10% formal saline solution for fixation & preservation. The formol fixed sample was washed properly & a careful dissection was done to expose the desired structures.

Grouping of the samples:

The samples were divided into four age groups; Group A (21-29 years), Group B (30-39 years), Group C (40-49 years), Group D (50-59 years).

Procedure of the study:

Measurement of length of trachea: The length of trachea was measured in cm by a Measuring tape from the lower border of cricoid cartilage to the lower border of carina in midline[6].

OBSERVATION AND RESULTS:

Table-I:-

Age distribution in different study groups.

Study groups	Age range (in years)	No. of samples (n = 94)
A	21-29	32
B	30-39	32
C	40-49	16
D	50-59	14

Table- II:-

Length of trachea in different study groups.

Groups	No. of samples (n = 94)	Length in cm (Mean±SD)
A	32	8.87 ± 0.26 (8.5-9.10)
B	32	9.45 ± 0.32 (9.00-10.10)
C	16	9.83 ± 0.24 (9.50-10.30)
D	14	9.92 ± 0.21 (9.50-10.50)

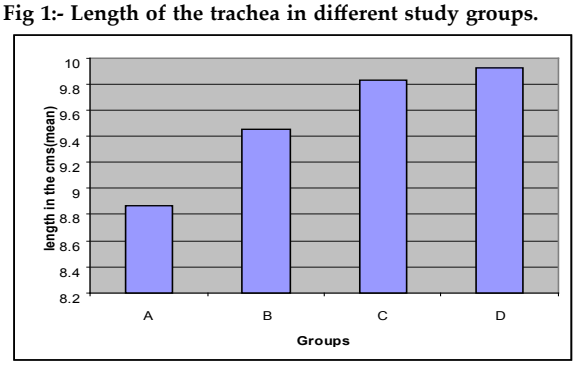
Table- III

Comparison of the groups:-

Groups	P value
A VS B	< 0.001***
A VR C	< 0.001***
A VS D	< 0.001***
B VS A	> 0.50ns
B VS C	> 0.20ns
B VS D	> 0.10ns
C VS A	> 0.10ns
C VR B	> 0.30ns
C VS D	> 0.20ns
D VS A	> 0.20ns
D VS B	> 0.10ns
D VS C	> 0.10ns

Figures in parentheses indicate range. Statistical analysis was done by ANOVA (multiple comparison), ns = not significant, *** = significant.

Fig 1:- Length of the trachea in different study groups.



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In the study, the mean lengths of the trachea were 8.87 ± 0.26 (8.5-9.10) cm in Group A, 9.45 ± 0.32 (9.00-10.5) cm in Group B, 9.83 ± 0.24 (9.50-10.00) cm in Group C & 9.92 ± 0.21 (9.50-10.50) cm in Group D. (Table-II & Fig-2). Statistical analysis showed positive correlation (r =+0.759) between age & length of trachea & it was highly significant (P<0.001).

DISCUSSION AND CONCLUSION:-

The present work was carried out on 94 tracheas of autopsied Maharashtrian adult males. The result showed similarity as well as dissimilarity with other studies. The values of the present study were lower than those described by different western authors e.g. Shah (2005)1, Snell (2004)7, Allen (2003)2, Thibodean & Patton (2003)8, Sinnatamby (1999)9 and Ellis & Feldman (1993)10.The racial and fixation factors may be responsible for the lower values of the present study. The findings were similar with that of Harjeet & Indarjit (2000)11. Their study included some adolescents which acted as the lowering effect of their values.

The length of trachea increased with advancing age. The values showed positive correlation with age & statistically it was highly significant (P<0.001). In the present study the length of the trachea increased with the increasing age. This study is useful for the anatomists, forensic experts, anesthetists and surgeons.

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