

A Study on Development and Morphometric Changes of Fallopian Tubes

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Abstract:

Background: Purpose of current study was to describe the variations found in the development, anatomical and functional importance of fallopian tube . This is about fundamental significance in treatment of infertility. **Methods:** The study is done on 32 embalmed female fetuses and 30 adult uteruses which were explored by gross dissection. The following data are noted from each specimen- length of tube, relation of tubes on both sides, number of fimbria and anomalies . **Results:** In allspecimens studied the length of the tube is approximately 5.2-10.1 cm. The ampullary changes seen in 3rd trimester fetuses found to be convoluted. The convolutions are not so much marked in the 1st and 2nd trimester fetuses. In one foetus there is complete absence of left side tube. Another foetus found with absence of ampulla, infundibulum and fimbria on the right side, that is 6% congenital absence of one sided tube. The number of fimbria are in an average of 4-5 on both sides. Morgangi cysts present in tubes of 3 fetuses i.e. (9%). Study revealed that fallopian tubes of the young female 8-10 years shows less numbers of convolution. Among the groups average length of left and right fallopian tube were recorded shortest (7.4 cm and 7.2 cm) in prereproductive group than the reproductive (10.1 cm and 10.0 cm) and postmenopausal (10.0 cm and 9.9 cm) group. Luminal diameter of both the tubes in all adult specimens is narrowest diameter were recorded in the isthmus and widest in the ampullary segment. **Conclusion:** Developmental anomalies of fallopian tube and morphological changes with age is important in Infertility cases treatment.

Keywords: Fallopian tube, development, congenital anomalies, morphology.

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I. Introduction

The fallopian tubes are bilateral ducts, about 10 cm long that lie in the upper border of the broad ligament and connect the uterine cavity to the peritoneal cavity near the ovaries. They provide necessary environment for fertilization and the morula stage of development of zygote, developmentally the uterine tube represents the unfused proximal part of the vertebral oviduct⁽¹⁾ In many mammals the fimbriated end of the infundibulum embraces the ovary at the time of ovulation almost completely enclosing it and forming ovarian bursa. Such intimate relationship has not been observed in human female⁽²⁾

The fallopian tube is only duct in the body not attached to the gland it drains, this strange discontinuity is a fundamental feature in the architecture of female reproductive system:

Studies of Fallopian tube morphology has been increased rapidly during the last few decades. However, scientific interest in the fallopian tube is not new but originates when our planet was still sparsely populated.⁽³⁾

Clinician-pathophysiologist studied the relationships between cyclic functional and morphological changes in the ovary, endometrium and oviduct, then become interested in the diagnosis

In third century B.C., Based on the anatomical observations of Herophilus, the Alexandrian anatomist, Rufus the Greek anatomist and physician first described the human oviduct as “antennae or octopus like arms extending as prolongation from each side of the uterus”⁽⁴⁾. Gabriele Fallopius in his publication of “Observationes Anatomicae”⁽⁵⁾ illustrated the oviducts . The term ‘fallopian’ derived from his name. By the mid-nineteenth century, knowledge of the uterine tube was relatively complete but contemporary knowledge of the uterine tube derives in great part from twentieth century due to advances in technology and application regarding morphological findings. In the present era Age Related Changes of Morphology, Length And Luminal Diameter of Uterine tubes is studied due to increasing rate of infertility. Studies on morphometry of fallopian tube in respect to different age groups have been reported by different workers^(6,7,8).

II. Materials And Methods

32 foetal and 30 adult Specimens were collected from fresh embalmed human cadavers from department of Anatomy and Gynaecology, Rangaraya Medical College, Kakinada, Andhra Pradesh and excluding obvious pathological changes. Each specimen is complete with uterus and both the fallopian tube. The whole uterus was also taken out with fallopian tubes from the cadavers to get accurate measurement of the length of fallopian tubes. The specimen collected from the cadavers as the length was measured before fixing the specimen in 10% formalin. Since the fallopian tubes were tortuous, to measure the length first a flexible soft cotton thread was placed along the curve of the tube starting from the fimbriated end to the morphological uterotubal junction. Then the length was measured in centimeters. But the intramural part lies inside the uterine tissue and it was difficult to measure its whole length. According to several workers⁽⁹⁾ the length of the intramural part was 1 cm. specimens were collected from different age groups and each tube was complete with intramural, isthmus, ampulla and infundibulum segment. Morphological measurements were taken. Dissection procedure: A midline incision from xiphisternum to symphysis pubis. Abdomen is opened, intestines removed. The following data noted from the foetuses and the variations are photographed.

Fallopian tubes and their position:

1. On right and left sides.
2. Length of the fallopian tubes.
3. Number of fimbria on both sides. To measure the length of the tube first a flexible soft cotton thread was placed along the curve of the tube starting from the fimbriated end to the morphological uterotubal junction. According to several workers the average length of the intramural part is 1.0cm. Thus this 1.0 cm. was added to the measured length of each fallopian tube to calculate the complete length. The number of convolutions of fallopian tubes were also recorded.

As fallopian tube is a flexuous organ it shows some convolutions. The number of convolutions were more in children and age between 20-45 years. Convolutions are less seen in postmenopausal women. In all specimens different parts of the fallopian tubes were easily identified by their relative diameters. Uterine tubes were enclosed in a peritoneal fold derived from broad ligament and mesosalpinx were present in all specimens. The average length of left and right fallopian tubes were observed as in children 5.1-7.1 cm, and perimenopausal group ranges from 8.4 cm to 9.0cm respectively. In all specimens the luminal diameter of the fallopian tubes were recorded at three different segments starting from medial to lateral, intramural or interstitial, isthmus and ampulla. children group exhibited average luminal diameter of left and right uterine tube at interstitial, isthmial and ampullary as 1.0 mm and 0.9 mm, 0.24 mm and 0.26mm and 5.3 mm and 5.9 mm respectively. In reproductive group, i.e. from 20 – 45 years, average luminal diameter of left and right oviduct was recorded at interstitial, isthmial and ampullary regions as 0.57 mm 0.21 mm and 6.4 mm, and 0.49 mm, 0.2 mm and 5.8 mm respectively. Average luminal diameter of left and right uterine tube was recorded at interstitial, isthumeal and ampullary as 1.82 mm, 0.27 mm and 6.2 mm and 1.7 mm, 0.21 mm and 6.0 mm respectively in postmenopausal group. In all specimens it was noted that the luminal diameter of both the tubes were narrowest in the isthmus segment and widest in the ampullary part of Fallopian tube. Single tube absent in two foetuses, in one foetus complete absence of left side tube and another foetus right side tube i.e. 6% absence of tubes in present study. The number of fimbria varies from 4-5 on both sides of tubes.

Discussion :- Results and observations obtained in the present study revealed several points of interest having marked importance in practical life which may help in investigation and management of infertility cases. Morphology: As well known fallopian tube is a flexuous organ, in the present study it was found that number of convolutions were more in reproductive age group than the pre reproductive and post menopausal groups which might be due to strong muscular activity required to propel the ovum and zygote to the uterine cavity as has been stated by previous research worker⁽¹⁰⁾. The average length of uterine tubes obtained in children was shorter than the reproductive and postmenopausal groups. The average length recorded in reproductive age and postmenopausal groups were similar with that observed by other researchers. The reason for shorter length of uterine tube in prereproductive group might be explained in the light of that the tube is still in the process of growth and while, in other two groups the growth process has already been completed. In all the groups it was recorded that left fallopian tube was little longer than the right one though there was no significant difference which could possibly be due to the fact that the left tube might get little more space during growth and development than the right one. In all the groups it was noted that the luminal diameter of both the tubes were narrowest in the isthmus segment and widest in the ampullary segment and has been confirmed by some workers^(10,11) and could be possibly due to variation of thickness of musculature. Average luminal diameter recorded in the intramural segment of prereproductive and reproductive group were within the range of the most of the investigators^(12,13). Intergroup comparison showed that luminal diameter of both the tubes in the same segment found to be narrowest in reproductive and widest in postmenopausal which is suggestive of strong

muscular activity in reproductive age as has been confirmed by some investigators^(11,14). The abdominal ostium at the beginning of its development in 3rd and 4th thoracic segment and at close of development to 4th lumbar segments having wandered downwards through 12 segments which was observed in the present study.

III. Conclusion

The study showed important age related variations of the fallopian tube while the length and outer diameter of the fallopian tube increases from pre-reproductive to reproductive age group then it gradually decreases in postmenopausal period. Various parameters of fallopian tube may help in finding different diseases like salpingitis, ectopic pregnancy, infertility though rare, still further study will be needed in this subject. To know the Congenital anomalies also important in the treatment of infertility.

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