

## Research Article

# A study of morphometric variations of fallopian tube in female foetuses

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### ABSTRACT

**Background:** Purpose of current study was to describe the variations found in the development, anatomical functional aspect of fallopian tube in the embryonic life and further development in the adult. This is about fundamental significance in treatment of infertility.

**Methods:** The study is done on 30 embalmed dead female foetuses 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 i.e. absence of tube (Agenesis).

**Results:** In the thirty specimens studied the length of the tube is approximately 5-8 cm. The ampulla of 3<sup>rd</sup> trimester foetuses found to be convoluted. The convolutions are not so much marked in the 1<sup>st</sup> and 2<sup>nd</sup> trimester foetuses. In one foetus No 9 there is complete absence of left side tube. Another foetus No 20 tube length is 1 cm 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 foetuses i.e. (9%).

**Conclusion:** Majority of the foetuses length of the fallopian tubes vary from 5-8 cm. Single tube absent in two foetuses, one foetus left side complete absence and another foetus right side absence of ampulla, infundibulum and fimbria i.e. of about 6% congenital absence of tube is important for obstetricians for treating infertility.

**Keywords:** Fallopian tube, Ampulla, Infundibulum, Fimbria

### 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.<sup>1</sup> 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.<sup>2</sup>

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:

Interest in the oviduct has increased rapidly during the last four decades by the search for technique to regulate population growth. However, scientific interest in the fallopian tube is not new but originates when our planet was still sparsely populated.<sup>3</sup>

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

The important clinical problems relating to fallopian tubes are contraception, infertility, salpingitis, ectopic pregnancy and neoplasia.

Future efforts to improve the results of tubal plastic surgery will involve effect of resection of isthmic and ampullary segments of various lengths and at various locations, further evaluations of microsurgical techniques, as well as the use of microstaples and tissue adhesions are needed. By knowing about foetal tubes experiments designed to explore applications of laser technology can be undertaken. Management of patients whose tubes are missing will be contingent up on laprotomy progress. The use of grafts of various artificial materials and other tissues, such as blood vessels will fade away, barring a major technical break through. Homograft of non-vital organs, seem to offer reasonable approach in the near future.<sup>4</sup>

About one in seven marriages is invariably infertile. In addition to pathological conditions congenital absence of fallopian tube are responsible in about one third cases of infertility.

In view of current focus on fallopian tube for purposes of contraception, recanalization and clinical management of cases it is desirable to study the fallopian tube in different clinical condition such as abortion, ectopic pregnancy due to absence of tubes on one side.<sup>5</sup>

## METHODS

Source of data: the dead foetuses obtained from the department of obstetrics & gynaecology, Rangaraya medical college. Kakinada.

Required consent had been obtained from head of the department and ethical committee to conduct the study.

Sample size: the study was carried out on 30 dead female foetuses with the gestational ages of 12 weeks to 40 weeks.

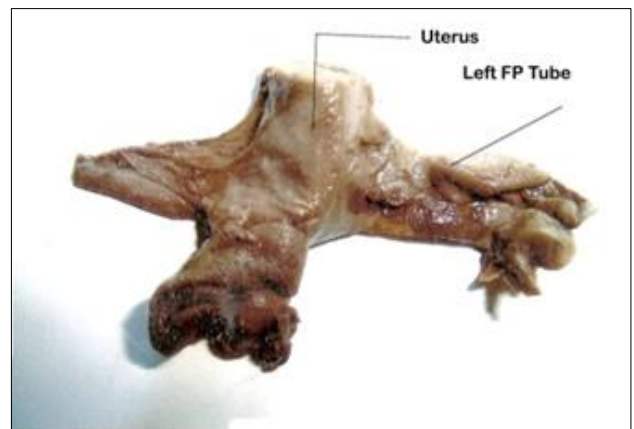
Dissection procedure: A midline incision from xiphisternum to symphysis pubis. Abdomen is opened, intestines removed. The following data noted from the foetuses and the variations are photographed.

Fallopian tubes and their position:

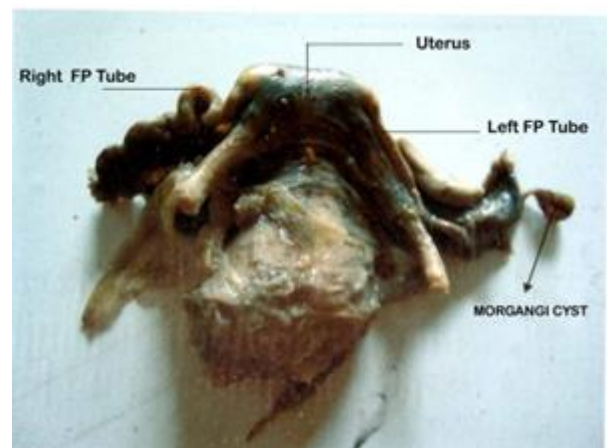
1. On right and left sides.
2. Length of the fallopian tubes.
3. Number of fimbria on both sides.
4. Variations of the tubes.



**Figure 1: Absence of tube in foetus on left side.**



**Figure 2: Absence of ampulla and the rest of tube except isthmus part.**



**Figure 3: Foetus left tube with hydatids of morgangi.**

## RESULTS

The present work morphometry of fallopian tube on 30 female foetuses. The length of the fallopian tube in foetuses varies from 5-8 cm on both sides. Single tube absent in two foetuses, in one foetus complete absence of

left side tube and another fetus 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. In three fetuses cysts of morgangi is found.

**Table 1: Foetuses of different gestational ages giving their length and number of fimbria of the fallopian tube on right and left side with absence of tube of one side of two foetuses.**

Sr. No.	CRL	Weight of foetus (grams)	Foetus (weeks)	Length of tube		No. of fimbria	
				Right	Left	Right	Left
1	11 cm	110	16	5 cm	5 cm	6	4
2	16 cm	350	20	4 cm	4 cm	3	4
3	18 cm	450	21	4 cm	4 cm	3	3
4	17 cm	550	21.7	4.9 cm	4.8 cm	4	4
5	19.5 cm	650	23.7	5 cm	5 cm	4	5
6	19 cm	650	23	5 cm	5 cm	5	5
7	19 cm	660	23.7	4 cm	4 cm	4	4
8	17.5 cm	750	24.4	5 cm	5 cm	4	4
9	18 cm	800	25	5 cm	Absent	4	Absent
10	20.5 cm	1150	25.	5.9 cm	5.9 cm	4	4
11	20 cm	1150	25.3	6 cm	6 cm	4	5
12	21 cm	1250	26.2	5.5 cm	5.5 cm	5	4
13	22 cm	1250	26.4	6 cm	6 cm	5	5
14	21.5 cm	1250	27	4 cm	4 cm	3	3
15	22 cm	1300	28	5 cm	4.9 cm	4	5
16	22 cm	1350	27	5 cm	5 cm	4	4
17	26.5 cm	1550	27.9	5.5 cm	5.5 cm	4	4
18	27 cm	1550	28.3	5.6 cm	5.5 cm	5	5
19	25.2 cm	1750	28	6 cm	6 cm	4	4
20	25.2 cm	1750	28.3	Absent	6 cm	Absent	4
21	25.4 cm	1755	28	6 cm	6 cm	4	4
22	31 cm	2150	28	8 cm	8 cm	6	4
23	31.5 cm	2150	31.3	7.9 cm	7.8 cm	6	4
24	31.6 cm	2300	31.6	8 cm	8 cm	5	4
25	32 cm	2400	31.6	7.9 cm	7.8 cm	5	4
26	32 cm	2400	31.6	6 cm	6.5 cm	5	5
27	32.5 cm	2425	33	8.1 cm	8.1 cm	5	4
28	32 cm	2450	33	7.9 cm	8 cm	5	5
29	34 cm	2450	33.6	8.1 cm	8.2 cm	5	5
30	34.5 cm	2700	34	8 cm	7.8 cm	4	5

CRL - Crown rump length

## DISCUSSION

According to the Embryology by Franz Kiebel and Frankli says a round duct the Mullerian duct is formed in both sexes on either side of the body in the 6<sup>th</sup> week at 10mm crown rump length of embryo as a longitudinal groove like invagination of the coelomic epithelium on the lateral side of mesonephric ridge. According to its development the duct is divisible into a very short cranial portion (ostium abdominal tube) and very long caudal portion [tubal proper] by an independent outgrowth of the blind end of this invagination from the beginning the

Mullerian duct lies in the secondary summit of urogenital fold lateral to the primary excretory duct.

The summit portion of the fold prepares itself for the reception of Mullerian duct by beginning to separate from the rest of the fold as the tubar portion and its epithelial covering becomes higher at the region of the thoracic segments the first analogue of the ostium abdominal is noticed in embryos of 10 mm greatest length, circumscribed thickening of the epithelium at the summit of urogenital fold on level with third thoracic segment.

This place is termed tunnel area. Franz Kiebel and Frankli UP; Mall, Manual of Human Embryology.<sup>6</sup>

In an embryo of 11 mm greatest length a deep groove appears in the region of the posterior part of third and hold of 4th thoracic segment, the middle of the transverse section of the funnel area projecting into the subjacent mesenchyme of the urosagittal fold. The groove presents a dorsal and ventral lip. The deeper posterior part of the groove closes to form a tube by the ventral lip grooving towards and fusing with dorsal lip. The tube thus formed separates from the epithelium of the urogenital fold and the analogue of the cranial portion forms Mullerian duct is thus completed.

When fully formed it is cornet shaped. The opening of the cornet into abdominal cavity is termed the ostium abdominal tube. Joseph Kraft - Human Embryology Published By Paul. B. Hocker.<sup>7</sup>

Joseph Kraft - Human Embryology Published By Paul. B. Hocker further discussed in his study that

In addition to the principal funnel two or four accessory funnels are also formed. These separate from parent tissue and their ends thus become free unite with principal funnel when union is complete they become hollow. The scattered dentation of the margins form the analogue of the fimbriae. The first distinct fimbria occur in embryos of 28-30 mm. In those 60mm head foot length the fimbriae ovarica appear as grooved projection directly caudally towards the cranial pole of the ovary this was seen in the present study of foetuses of 110 mm.

At the very time the posterior end of the groove is separating from the epithelium it begins to grow caudally and in this process we come to the development of distal portion of Mullerian duct, it is formed by gradual outgrowth of tip of cornet.<sup>8</sup>

The lumen extends continuously from the funnel in to the caudal portion of the duct and follows the growth of the duct so closely that all that is ever solid is a small terminal portion in this way the larger proximal portion of the duct becomes hollow. In its distal portions the lumen arises is low and is accordingly frequently discontinuous leads to tubal blockage. This is of importance to obstetricians to treat infertility due to tubal blockage.

The abdominal ostium at the beginning of its development in 3<sup>rd</sup> and 4<sup>th</sup> thoracic segment and at close of development to 4<sup>th</sup> lumbar segments having wandered downwards through 12 segments which was observed in the present study.

The end of the tube never reaches the cranial pole of ovary but projects beyond it. In the present study it was observed that the tube projected beyond the cranial pole

of ovary in all foetuses as mentioned by Pattern & Pattern Foundations of Embryology.<sup>9</sup>

According to developmental anatomy by Leslie Arey congenital absence of one or both uterine tubes are seen. In the present study in 30 female foetuses two foetuses absence of one side tube seen. In one foetus left side tube complete absent and another foetus right side tube absent, that is 6% congenital absence of tubes which is consistent with other studies conducted.<sup>10</sup>

According to R. Narayana duplication of left fallopian tube bifurcated at ampullary region, which was not seen in the present study.<sup>11</sup>

## CONCLUSION

The length of the fallopian tube in female foetuses varies from 5-8 centimeters. In the present study single tube is absent in two foetuses, one foetus the left side tube is absent (agenesis) and another foetus on right side, the tube only 1 centimeter present with complete absence of ampulla, infundibulum, and fimbriae i.e. 6%. The cysts of morgangi present in three foetuses which has no significations.<sup>3</sup>

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