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Luminal Diameter and Wall Thickness of Fallopian Tubes of Various Contraceptive Users (Oral and IUCD) in Northern Zone of Bangladesh

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ABSTRACT: ***Background:*** The Fallopian tube is a muscular tube-like structure that makes communication between the uterus and the ovary. It is the most common cause of infertility and inflammatory diseases. ***Methods:*** This cross-sectional type of descriptive study was conducted over a period of 1 year from July 2022 to June 2023 in the Department of Anatomy, Rajshahi Medical College Hospital, Rajshahi on 195 Fallopian tubes which were under contraceptive use for at least last 6 months or discontinued it within the last 3 months. Then the luminal diameter and thickness of the wall of the tube were measured and documented in a semi-structured questionnaire. Data was analyzed by SPSS software (version 24.0). ***Results:*** The study revealed that among 195 Fallopian tubes, 165 (84.60%) were under oral pill and the remaining 30 (15.40%) were under intrauterine contraceptive device (IUCD). Mean luminal diameter and wall thickness of Fallopian tube of oral contraceptive pill users were 1.18±0.09 mm and 629.82±66.39 µm, respectively. On the other hand, mean luminal diameter and wall thickness of Fallopian tube of intra-uterine contraceptive device users were 1.29±0.17 mm and 716.33±23.23 µm, respectively. Luminal diameter and wall thickness were significantly higher in IUCD users than oral pill users ($p < 0.001$ and $p < 0.001$, respectively). ***Conclusion:*** Even though contraceptive use is safe, their use might slightly increase the risk of health problems. So, precautions must be taken during contraceptive use.

Keywords: Luminal Diameter, Wall Thickness, Fallopian Tubes, OCP, and IUCD.

Article at a glance:
Study Purpose*: The purpose of the study was to evaluate the luminal diameter and wall thickness of fallopian tubes of various contraceptive users (Oral and IUCD) in Northern Zone of Bangladesh.*
Key findings: *Mean luminal diameter of Fallopian tube was 1.18±0.09 mm in OCP, 1.29±0.17 mm in IUCD user group and wall thickness was 629.82±66.39 µm in OCP, 716.33±23.23 µm in IUCD user group.*
Newer findings: *The luminal diameter and wall thickness of IUCD users were markedly greater than those of oral pill users ($p < 0.001$ and $p < 0.001$, respectively).*
Abbreviations: *FSH: Follicle-stimulating hormone, IUCD: Intrauterine contraceptive device, LH: Luteinizing hormone and OCP: Oral contraceptive pill.*

INTRODUCTION

The Fallopian tube or the oviduct, also known as the uterine tube, is a paired hollow muscular tube, on either side of the uterus and lies at the upper margin of the broad ligament of uterus. The anatomy of the Fallopian tube is complex starting from its development, ciliated microstructure and vascular structure. It is the key to the conduit of ova and fertilization.[1] Fallopian tube consists of intramural part (uterine end), isthmus, ampulla (wider portion) and infundibulum. Its average length is about 10 cm.[2] The tube has an internal mucosa, an intermediate muscular stratum and an external serosa. Tubal mucosa is lined by simple ciliated columnar

epithelium. The epithelium is composed of at least four types of cells, their ratio varying with hormonal levels and position. These are ciliated columnar, secretory, peg (intercalary) and undifferentiated cells. Ciliated cells are the cells in which ciliary movements are directed toward the uterus. These are columnar, with a relatively large nucleus. The numbers of ciliated cells are greater at the fimbriated end of the tube.[3-5] Secretory cells are most active around the time of ovulation. Their secretions include nutrients for the gametes and aid capacitation of the spermatozoa.[6] Combined Oral contraceptive pills (COCP) are a type of oral medication formed by the combination of estrogen and progesterone hormones. It was developed to prevent ovulation by suppressing the release of gonadotropins.[7, 8] Individuals who use oral contraceptives, progestogen negative feedback decreases the release of gonadotropin-releasing hormone (GnRH) by the hypothalamus which decreases the secretion of follicle-stimulating hormone (FSH) and greatly decreases the secretion of luteinizing hormone (LH) by the anterior pituitary.[9] Estrogen was originally included in oral contraceptives for better cycle control (to stabilize the endometrium and thereby reduce the incidence of breakthrough bleeding) but was also found to inhibit follicular development and help to prevent ovulation.[10] The estrogen and progestogen in COCPs have also other effects such as i) Slowing tubal motility and ova transport which may interfere with fertilization. ii) Endometrial atrophy and alteration of metalloproteinase content which may impede sperm motility and viability or theoretically inhibit implantation. iii) Endometrial edema which may affect implantation.

An intrauterine device (IUD) is also a type of birth control method which is inserted by a healthcare provider into the uterus. IUDs are the most commonly used type of long-acting reversible contraception (LARC). Once an IUD is inserted, one doesn't have to worry about birth control until it's time to replace it (three to 10 years, depending on the brand). LARCs, which include IUDs and contraceptive implants, are the most effective form of birth control that doesn't require surgery. After oral contraceptive, the intrauterine contraceptive device (IUCD) is the most common temporary contraceptive method employed today. Many studies were carried out in various parts of the world to disclose the side effects of different types of contraceptives (oral pill, IUCD) on different organs including the Fallopian tube. The IUCD is the foreign body placed in the uterine cavity to prevent pregnancy. Clinical research in different parts of the world concentrated on investigating the relationship between tubal inflammatory changes and the use of various contraceptives (oral and IUCDs). Previous studies in other parts of the world demonstrated a positive association between the incidence of tubal inflammation and the use of IUCD by histological examination.[11-13] About 90% to 99% of all ectopic pregnancies were tubal and there was an increased incidence of ectopic pregnancy in women using IUCD.[14, 15] There are no known histological studies available on Fallopian tube exclusively in this part of Bangladesh. So, the study was aimed to find out the effect of contraceptive use on the oviducts in Northern zone of Bangladesh as revealed by light microscopy. The findings of this study might help to understand the effect of contraceptives on Fallopian tube histomorphologically.

METHODS

This was a cross-sectional type of descriptive study at the Department of Anatomy, Rajshahi Medical College, Rajshahi over a period of 1 year from July 2022 to June 2023 to assess the luminal diameter and wall thickness of fallopian tubes in the Northern Zone of Bangladesh among users of multiple contraceptives (Oral and IUCD). About 1.5 cm of surgically resected Fallopian tubes were collected during the process of tubectomy by Pomeroy's method from Model Family Planning Clinic, RMCH, Maternity & Child Welfare Centre (MCWC) of Rajshahi, Maternal & Child Health (MCH), Kalabagan, Rajshahi, Upazilla Health Complexes of Rajshahi District, different private hospitals and clinics in Rajshahi city and different centers under the District Family Planning Offices of Natore, Noagon and Chapainababgonj districts. These tissue samples were immediately cleaned by washing with normal saline and were preserved in appropriately labeled containers filled with 10% formalin. The specimens were brought to the Histology Lab at Department of Anatomy of Rajshahi Medical College where these were kept at room temperature. Later the tubal segments were processed and sectioned properly, and slides were prepared. Then the slides were stained with haematoxylin-eosin stain. The slides were viewed under a light microscope using both low (x 10) and high (x 40) magnification. Different variables, i.e.

luminal diameter and thickness of the wall of the tube were measured.

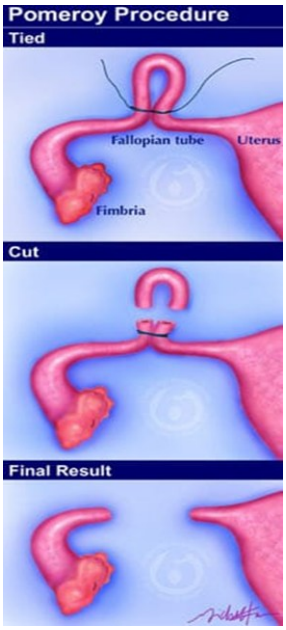

Figure 1: Pomeroy Method

All information was collected in separate data record form. All data were analyzed by using the Statistical Package for Social Sciences (SPSS) software, 24-version. Categorical variables were summarized by using numbers and percentages while continuous variables were summarized by means ± standard deviation (SD) and median. An independent t-test was used to compare luminal diameter and wall thickness between the oral pill and IUCD users. A p-value < 0.05 was considered statistically significant for all tests.

RESULTS

Distribution of the Fallopian tube on the basis of contraceptive use revealed that out of 195 Fallopian tube, 165 (84.60%) were under OCP and remaining 30 (15.40%) were under IUCD. Age distribution of the women showed that 124 (63.60%) were within the age group of 30-39 years, 60 (30.80%) were < 30 years and 11 (5.60%) were ≥ 40 years (Table 1).

Table 1: Types of Contraceptives and Age Distribution of the Women (N=195).

Variables	Frequency	Percentage
Types of contraceptive use		
OCP	165	84.60%
IUCD	30	15.40%
Age (Years)		
< 30 years	60	30.80
30-39 years	124	63.60
≥ 40 years	11	5.60

Mean luminal diameter and wall thickness of Fallopian tube of OCP users were 1.18±0.09 mm, 629.82±66.39 μm, respectively and 1.29±0.17 mm, 716.33±23.23 μm, respectively in IUCD user group. So, it was clear that the mean luminal diameter and wall thickness of Fallopian tube were significantly higher among the IUCD users than the oral pill users (p < 0.001 in both cases) (Table 2).

Table 2: Comparison of Luminal Diameter and Wall Thickness of Fallopian Tube Between OCP and IUCD Users (OCP Users =165, IUCD Users =30).

Variables	OCP users mean±SD (mm)	IUCD users	t-value	p-value
Mean luminal diameter of Fallopian tube (mm)	1.18 ± 0.90	1.29 ± 0.17	4.9	< 0.001
Mean wall thickness of Fallopian tube (μm)	629.82 ± 66.39	716.33 ± 23.23	12.94	< 0.001

(Data were analyzed by Unpaired t-Test and were expressed as mean ± SD.)

DISCUSSION

The Fallopian tubes are complex structures that communicate the ovaries to the uterine cavity. They are sites of various interactions necessary for normal pregnancy. In this study type of contraceptives used by the women was an important issue. The aim of this study was to evaluate the luminal diameter and wall thickness of fallopian tube of contraceptive users (oral and IUCD) in Northern zone of Bangladesh. This study revealed that out of 195 fallopian tubes 165 (84.60%) were under oral pill and remaining 30 (15.40%) were under intrauterine contraceptive device (IUCD). The mean luminal diameter of tube was 1.18 ± 0.09 mm among the OCP users and 1.29 ± 0.17 mm among the IUCD users seen by the present study. So, the mean luminal diameter of Fallopian tube was significantly higher among the IUCD users than the contraceptive users ($p < 0.001$). Naher *et al.*, reported dissimilar findings where there was no significant difference of mean luminal diameter between the OCP users and IUCD users' group ($p > 0.05$) but luminal diameter of Fallopian tube was reduced in both OCP users and IUCD users' group.[14] In the current study, mean wall thickness of Fallopian tube was 629.82 ± 66.39 μm among the OCP users and 716.33 ± 23.23 μm among the IUCD users. So, the mean wall thickness of Fallopian tube was significantly higher among the IUCD users than the oral OCP users ($p < 0.001$). The finding observed by Naher *et al.*, was not significant; when wall thickness of Fallopian tube between the OCP users and IUCD users' group ($p > 0.05$).[14]

CONCLUSION

The study concluded that luminal diameter and wall thickness were significantly higher in IUCD users than oral pill users. So, precautions should be taken during contraceptive use. This study might be helpful to drug manufacturing authorities concerned with contraceptive production.

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Conflict of Interest: Authors declared no conflict of interest.

Ethical Approval: Ethical approval of the study was obtained from the Ethical Review Committee, Rajshahi Medical College, Rajshahi. Informed consent was taken from all participants. All the study methodology was carried out following the relevant ethical guidelines and regulations.

Consent for publication: Taken.

REFERENCES

1. Kumar V, Cotran RS, Robbins SL. Basic pathology. Philadelphia. 1997; Basic pathology. Philadelphia.
2. Borgohain M, Gogoi G, Rahman M, Roy R, Gogoi NA. Histopathological Study of Fallopian Tube Lesions - in a Tertiary Care Centre. International Journal of Contemporary Medical Research. 2020; 20 (2): E5-8.
3. Bannister LH, Dyson M. Reproductive System. In: Williams PL, Bannister LH, Berry MM & Collins P (eds) Gray's Anatomy. 1995; 38 ed. New York: Churchill Livingstone.

4. Gemzell-Danielsson K, Mansour D, Fiala C, Kaunitz AM, Bahamondes L. Management of pain associated with the insertion of intrauterine contraceptives. Journal of Assisted Reproduction and Genetics. 2013; 31 (10): 1337–1347.
5. Mescher AL, Reproductive System. In: Junqueira's Basic Histology: Text & Atlas. 15 ed. New York: McGraw-Hill Education, 470-471.
6. Standring, S.ed. Gray's Anatomy: The Anatomical Basis of Clinical Practice. 2016. 41st ed. London: Elsevier.
7. Lassi ZS, Bhutta ZA. Clinical utility of folate-containing oral contraceptives. Int. J. Womens. Health. 2012; 4 (1): 185–190.
8. Middleton LJ, Daniels JP, Weckesser A, Bhattacharya S, PRE-EMPT trial collaborative group. Preventing recurrence of endometriosis by means of long-acting progestogen therapy (PRE-EMPT): report of an internal pilot, multi-arm, randomised controlled trial incorporating flexible entry design and adaption of design based on feasibility of recruitment. Trials. 2017; 18 (2): 121.
9. Speroff L, Darney P. Intrauterine contraception. A Clinical aspect of Gynaecological Journal. 2011; 20 (1): 33-35.
10. Trussell J. Contraceptive failure in the United States. Contraception. 2011; 83 (2): 397–404.
11. Kajanoja P, Lang B, Wahistom T. Intrauterine contraceptive devices (IUCDs) in relation to uterine histology and microbiology. Act Obstet Gynecol. 1987; 66 (2): 445-449.
12. Poma PA. Intrauterine contraception and tubal pathology. Int J Fertil. 1980; 25 (1): 287-292.
13. Smith MR, Soderstrom R. Salpingitis: A frequent response to intrauterine contraception. J Repro Med. 1976; 16 (2): 159-162.
14. Naher S, Mullick MH, Ara J. Effects of Intrauterine Contraceptive Device (IUCD) on Lumina Diameter, Wall Thickness and Number of Ciliated Cells of Fallopian Tubes in Bangladeshi Women. jmsr-journal.com. 2008; 10 (1): 16-21.
15. Wollen AL, Flood PR, Sandvei R, Steier JA. Morphological changes in tubal mucosa associated with the use of intrauterine contraceptive devices. British journal of obstetrics and gynaecology. 1984; 91 (11): 1123–1128.