MORPHOLOGICAL STUDY OF THE AGE RELATED CHANGES OF THE CERVIX

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ABSTRACT

BACKGROUND
Disease of the cervix is a common clinical condition in females, worldwide and especially in a developing country like India. The study was undertaken in Guwahati Medical College to see the age related changes in the morphology of the cervix.

AIM
The study was done to observe the age related changes in the cervix and compare the same with the different studies done by the previous workers around the world so as to help clinicians to diagnose the pathologies of this part of the female reproductive system better.

MATERIALS AND METHOD
The specimens were divided into three groups viz. pre-reproductive, reproductive and post-menopausal. Twenty specimens were collected of each group. The results were statistically analysed and 't' test was employed to find out the significant difference between the mean value.

SUMMARY
A study of the 60 specimens collected were done to find the morphological parameters of each group viz. pre-reproductive, reproductive and post-menopausal and the findings of each group were compared to one another and were related to the finding of previous workers.

CONCLUSION
The study showed that there were certain differences in the morphology of the three groups and these differences tallied with that of the previous workers.

KEYWORDS
Cervix, Pre-reproductive, Reproductive, Post-menopausal.

INTRODUCTION: The cervix is a distinctive part of the female reproductive organ, the uterus which requires an elaborate study as it is a common site of pathology in females and the most life threatening being carcinoma of the cervix. The cervix is the terminal portion of the uterus. It separates the vagina from the uterine cavity. The cervix is a thick walled, cylindrical structure that tapers at its inferior extremity. The canal of the cervix measures about 2.5 cm to 3 cm in length. It is fusiform in shape and slightly dilated in the middle third. The lower opening is known as external os, which opens into the portio vaginalis, and its upper opening, known as the internal os, opens into the uterine cavity. The cervix acts as a biological valve which at certain period of the reproductive cycle allows the entry of sperm into the uterus and at other times bars their admission.

It is of major interest and importance as it is a common site for development of malignancy and also represents the primary barometer in the process of labour and delivery. No other organ is so easily accessible to obstetrician and gynaecologist in terms of both diagnosis and therapy. The study of the morphology was conducted to aid clinician's deal with patients who are at risk of cervical malignancy which is predominant among the women of our country.

MATERIALS AND METHODS: The study of the human cervix was conducted in the Department of Anatomy, Guwahati Medical College. The collected specimens were grouped into three according to the different age namely, Pre-reproductive (Newborn to 13), Reproductive (14 yrs. To 49 yrs.) and Post-menopausal (50 yrs. and above). The results were statistically analysed and 't' test was employed to find out the significant difference between mean value. The cervices were collected from the autopsies done in the Forensic Medicine Department, Guwahati Medical College. Specimens were collected from the cadavers following all legal formalities when autopsies were done within stipulated time limit.

Care was taken to collect the non-pathological specimens. The whole uterus was taken out from the cadaver to get accurate measurement of length of the cervix. Specimens were also dissected out from fresh full term intrauterine dead and neonatal dead babies, collected from Obstetrics and Gynaecology Department, Guwahati Medical College, following all legal formalities. The collected specimens were grouped after noting the age and the history (Menstrual and parity) of the cadaver. Morphological measurements were taken immediately after collection, before the specimen was fixed. To measure the length of the cervix, standard centimetre scale was placed along the length of the cervix (Fig. 7). Biometrical values of different groups were recorded and statistically analysed for Mean, and 't' test was employed to find out the significant difference between mean value.

OBSERVATION AND RESULTS: The cervices in all the age groups were found to be cylindrical. The external os is circular in the pre-reproductive and the nulliparous of the reproductive (Fig. 8), but in the parous cervix, the os was found to be a transverse slit (Fig. 9). The peritoneum covers the cervix externally only over the posterior aspect of the supravaginal part. The cervical canal was found to be spindle shaped. The luminal canal was irregular in both the pre-reproductive and the reproductive group, but the irregularities decreased in the post-menopausal group. The canal remained closed in the nulliparous. The canal in the parous cervix is not tightly closed. (Fig. 10). The average length of the cervix in group A, group B, and group C are 1.885 cm, 2.6 cm, and 2.06 cm respectively. Intergroup variation of the length of cervices of pre-reproductive, reproductive and post-menopausal group has been shown with the help of a bar diagram (Fig. 2.1).

The distribution of total samples was as follows:

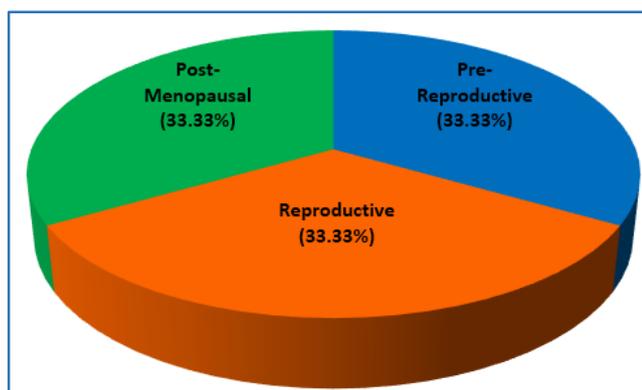| Reproductive Status	Number	%
Pre-Reproductive	20	33.33
Reproductive	20	33.33
Post-Menopausal	20	33.33
Table 1: Distribution of Samples according to their Reproductive Status		

Figure 1.1: Pie Diagram Showing the % Distribution of Samples according to their Reproductive Status

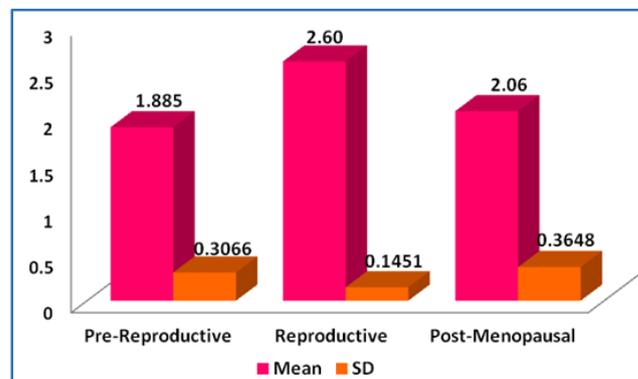| Reproductive Status	Mean±SD	95 % CI
Pre-Reproductive	1.885±0.3066	1.742, 2.028
Reproductive	2.60±0.1451	2.532, 2.668
Post-Menopausal	2.06±0.3648	1.889, 2.231
Table 2: Mean & SD values of the Sample Women w.r.t. their Reproductive Status		

Fig. 2.1: Graph Showing the Mean & SD Values of Length of Cervix among the Sample Women w.r.t. Reproductive Status

Interpretation: Table 2 and its corresponding figure 2.1 have depicted the mean distribution of length of cervix among the sample women according to their reproductive status. It has been found that the mean score of cervix length is high among the reproductive group than the two other groups. The mean cervix length is found to be lower among the pre-reproductive group. The mean and SD value are 1.885±0.3066, 2.60±0.1451 and 2.06±0.3648 respectively among the pre-reproductive, reproductive and post-menopausal women. The mean scores of cervix length of all the three groups have been found to be within 95% Confidence Interval.

Comparison: A comparative analysis of the cervical length of the three groups was done to test whether there is a significant difference in the cervix length. To fulfil this purpose 't'-test was adopted between the groups.

Comparison between Pre-reproductive & Reproductive Groups

Reproductive Status	Mean	SD	d.f.	t-value	Significance level
Pre-Reproductive	1.885	0.3066	38	9.428**	p<0.01
Reproductive	2.60	1.451			
Table 3: Mean & SD Scores Of Cervix Length Among the Pre-reproductive & Reproductive groups with 't'-value					

**→ highly significant; d.f.→ degrees of freedom

(The critical value or p-value of t for 38 d.f. at 0.01 level of significance is 2.71).

Fig. 3.1: Graph Showing the mean & SD Scores of Cervix Length among the Pre-reproductive and Reproductive Groups

Interpretation: Table 3 and its corresponding figure 3.1 have shown the mean distribution of cervix length between the pre-reproductive and reproductive groups of samples. The mean length of cervix has been found out to be lower among the pre-reproductive stage than their reproductive counterparts. To test whether this difference is statistically significant or not, the investigator has adopted 't'-test. The result has shown that there is a highly significant difference in cervix length between the two groups as p<0.01.
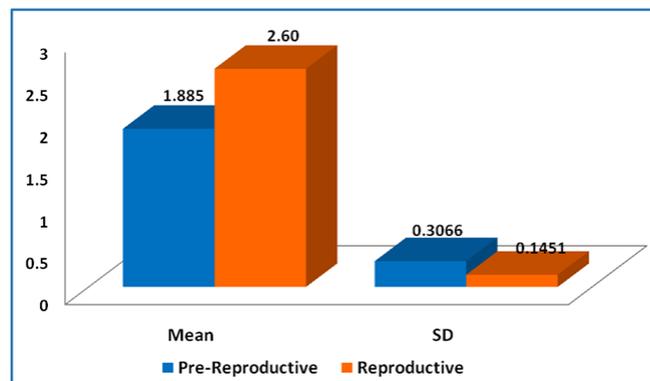
Comparison between Pre-reproductive & Post-Menopausal Groups

Reproductive Status	Mean	SD	d.f.	t-value	Significance Level
Pre-Reproductive	1.885	0.3066	38	1.643	N.S.(p>0.01)
Post-Menopausal	2. 06	0.3648			
Table 4: Mean & SD Scores of Cervix Length among the Pre-reproductive & Post-Menopausal groups with 't'-value					

N.S. → Not significant

Fig. 4.1: Graph Showing the mean & SD Scores of Cervix Length among the Pre-reproductive and Post-menopausal groups

Interpretation: Table 4 and figure 4.1 have depicted the mean distribution of cervix length between the pre-reproductive and post-menopausal groups of samples. The mean length of cervix has been found out to be lower among the pre-reproductive stage than the post-menopausal group. To test whether this difference is statistically significant or not, the investigator has adopted 't'-test. The result has shown that there is no significant difference in cervix length between the two groups as p >0.01.
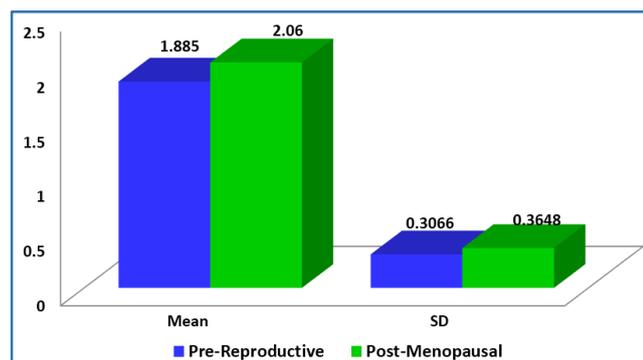
Comparison between Reproductive & Post-Menopausal Groups

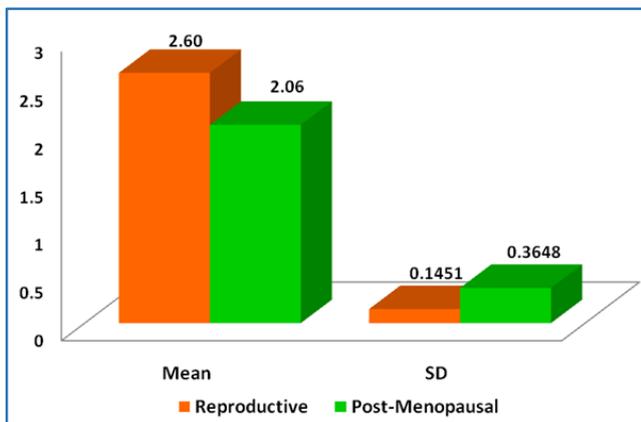| Reproductive Status	Mean	SD	d.f.	t-value	Significance level
Reproductive	2.60	1.451	38	6.152**	p<0.01
Post-Menopausal	2.06	0.3648			
Table 5: Mean & SD Scores Of Cervix Length Among the Reproductive & Post-Menopausal groups with 't'-value					

Fig. 5.1: Graph Showing the mean & SD scores of Cervix Length among the Reproductive and Post-Menopausal Groups

Interpretation: Table 5 and figure 5.1 have shown the mean distribution of cervix length between the reproductive and post-menopausal groups of samples. The mean length of cervix has been found out to be higher among the reproductive group than their post-menopausal counterparts. To test whether this difference is statistically significant or not, the investigator has adopted 't'-test. The result has shown that there is a highly significant difference in cervix length between the two groups as $p<0.01$.
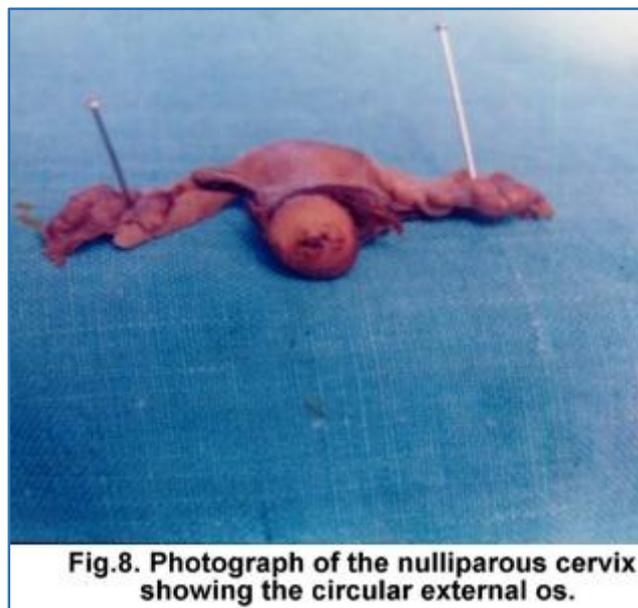

Fig.8. Photograph of the nulliparous cervix showing the circular external os.

Fig.9. Photograph of the early menopausal cervix showing the transverse slit of external os in the parous cervix.

Fig.6. Photograph of the pre reproductive cervix

Fig.7. Photograph of the reproductive cervix showing the length and procedure of measurement

Fig.10.Photograph of the parous cervix showing the cervical canal.

DISCUSSION: Results and observations obtained in this study reveal several points of interest having marked importance in practical life. Hence, these have been considered worthy of discussion in conjunction with the findings of other workers to find a definite conclusion in respect of morphology and biometrical difference among different age groups. It is known that the cervix is the terminal end of the uterus. In the present study, it is found that the cervix is cylindrical in all age groups viz. pre-reproductive, reproductive and post-menopausal group which is similar to Susan Standring.[1] 2008; Peter Abrahams.,[2] John Craven and John Lumley 2011; Keith L. Moore.,[3] Anne M.R. Agur and Arthur F.Dally 2011.

The external os is circular in the pre-reproductive and in the nullipara of the reproductive group, while the external os in parous cervix is a transverse slit due to the minor laceration in the process of labour and child birth. These findings are analogues with the reports of J. B. Blaikley.[4] 1963; Bannister and Dyson.[5] 1995, Neeta V Kulkarni.[6] 2011. In all the age groups, it is observed that the cervix is not covered by visceral peritoneum anteriorly, it covers only the supravaginal part posteriorly which then reflects back. This observation is similar to the observation of Bannister and Dyson.[5] 1995, Pratap Kumar.[7] 2014. The cervical canal in the study is found to be spindle shaped and the luminal surface is found to be irregular due to the presence of mucosal folds. This is similar to the findings of Tindall.[8] 1994, Bannister and Dyson.[5] 1995, Moghissi.[9] 1999. The cervical canal remained closed in nullipara analogues with the findings of Tindall.[8] in 1994.

The internal os remains closed in all the groups and act as a sphincter, this was also mentioned by Shirish Daftary.[10] and Sudip Chakravarti 2014. In late menopause, the internal os disappears. This was stated by Tindall.[8] 1994. It is evident from the present study that the average length of the cervix in pre-reproductive, reproductive and post-menopausal groups to be 1.885 cm, 2.60 cm, and 2.06 cm respectively. This observation is parallel with the several workers who mentioned the length of cervix to be between 2.5 to 3 cm. in reproductive group Sahana[11] 1985, Tindall[8] in 1994, Moghissi.[9] in 1999, Bannister.[5] and Dyson in 1995, Pratap Kumar.[7] 2014. It has been observed from the study that the cervix is longest in the reproductive group, which may be due to hormonal level. This is similar with the observation of Tindall.[8] 1994 and Bannister and Dyson.[5] 1995.

The length of the cervix in the childhood is shorter than that of the newborn. This is due to involution after birth. The neonatal size is not regained until puberty. This is similar to the observation of Collins.[12] 1995 and Grays, who mentioned that the neonatal size is longer than childhood due to the influence of the maternal hormones before birth. It was found in the study that the cervix decreased in length in the post-menopausal group which was similarly noted by Bannister and Dyson.[5] 1995.

CONCLUSION: The present study was focused on the changes of the cervix at different age group. In pathological conditions like congenital hypertrophy, haematocervix, uterine prolapse, non-malignant tumours like fibroma, adenoma, etc. and in malignant conditions there are changes in the normal morphology of the cervix. And as cervical pathologies are common, the study may aid in early diagnosis and treatment of diseases of this part of the female reproductive organ. Further study in this field is needed to know the histological changes with respect to age.

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