CILIATED CELL INDEX: A GUIDE TO FUNCTIONAL STATUS OF FALLOPIAN TUBE

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SUMMARY

Biopsies from fimbrial surface of oviducts were obtained from 21 patients to determine the incidence of ciliated cells. The biopsies were fixed in Karnovsky's fluid and embedded in araldite. Semithin sections (0.5 um) were stained with toluidine blue and incidence of ciliated cells determined. The following observations were made:

1. **The percentage of ciliated cells varied between 62 and 72 with no changes between the follicular and luteal phase of the menstrual cycle.**
2. **Reduced percentage of these cells occurred in amenorrhoea, ectopic pregnancy, hormonal contraception and in tubes showing thin walled hydrosalpinx.**

The study indicates that a decreased incidence of ciliary cells may imply defective ovum transport over the fimbrial surface. Determination of ciliated cell index may prove to be valuable method in the clinical assessment of infertility and aid in selection of cases suitable for reconstructive surgery.

Introduction

Sperm transport, capacitation, ovum transport, fertilization and early embryogenesis are fundamental reproductive events that normally take place in the lumen of the fallopian tube (Jansen, 1984; Kistner, 1979). More detailed knowledge of fallopian tube function should not only improve treatment of its anatomical and physiological disturbances but also provide a better empirical basis for its in vitro counter part.

It is now clearly established that in the epithelial layer of tubal mucosa there are two primary cell types viz., ciliated and secretory cells. The surface appearance of these cells often gives important clues as to their functional activity. The aim of this study was to determine the incidence of ciliated cells in normal fallopian fimbrial surface and under different clinical conditions.

Materials and Methods

Microbiopsies from the fimbrial surface were obtained at the time of laparoscopic sterilization or at the time of laparotomy for tubal surgery, pelvic endometriosis, ectopic pregnancy, etc. Care was taken to take the biopsies from fimbrial surface and

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not from ampulla. After fixation in Karnovsky's fluid the samples were processed and embedded in araldite. Semithin sections (0.5 um) were cut on ultramicrotome and stained with 1% toluidine blue. In each biopsy the percentage of ciliated cells in a count of atleast 500 cells was calculated.

Results

The percentage of ciliated cells in the fimbriae in normal fertile women varied between 62.5 and 66.5% with a mean of 63.98. The number of biopsies and percentage of ciliated cells in each category is given in Table I.

The decrease in the percentage of ciliated cells was found in various clinical conditions. In our material there was no significant difference in the number of ciliated cells in follicular and luteal phase of the menstrual cycle. In cases with amenorrhoea and ectopic pregnancy there was a decrease in the percentage of ciliated cells, 54.9% and 37.1% respectively. It is however more likely that the decrease is secondary to the effect of pregnancy than related to the occurrence of ectopic pregnancy.

Similar decrease was also evident in women using steroidal contraception and in tubes with thin walled hydrosalpinx; mean 39.15 and 29.4% respectively.

Discussion

The normal percentage of ciliated cells in our series was similar to those reported by Vasquez *et al*, 1980. The reduction in ciliated cells may slow down the transport of the ovum as it has been shown in experimental studies in rabbits (Odor and Blandau, 1973). The study on rabbits indicates that (a) transport over the fimbrial surface is effected by ciliary beat and (b) the rate of transport is related to the percentage of

TABLE I—*Percentage of Ciliated Cells on Fimbrial Surface in Various Clinical Conditions*

	Amenorrhoea	O.C. Pills combination	Pregnancy ectopic	Hydrosalpinx thin walled •	Tuboovarian lesion with hydrosalpinx on one side	Laparoscopic sterilization
No. of biopsies	2	2	4	4	4	5
Mean %age ciliated cells	54.9	39.15	37.1	29.4	67.7	63.1* 65.2†

• follicular phase. † luteal phase.

ciliated cells. Thus the loss of ciliated cells may decrease its functional efficiency and explain the discrepancy between patency rate and pregnancy rate after reconstructive surgery. In other words the percentage of ciliated cells seems to be a function of normalcy of the fallopian tube either as a cause or an effect. Ciliated cell index would therefore prove of value in the clinical assessment of infertility and help in selection of cases for reconstructive surgery.

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