# SIGNIFICANCE OF ENDOMETRIAL GLYCOGEN IN PRIMARY STERILITY

by

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## *Introduction*

Endometrial curettage is an essential diagnostic step of key importance in examination of a sterile female. In some patients, a clear cut abnormality like anovulatory cycle, histological immaturity or tuberculosis is found. Other sterile females show normal looking endometrium in late secretory phase when curettage is done in premenstrual period. Does assessment of glycogen by histochemical methods provide further useful information in such females?

The present study was conducted to evaluate the role of endometrial glycogen assessed histochemically in primary sterility.

## *Material and Methods*

The present study was conducted on 100 female patients presenting as primary sterility at the out-patient department of P.B.M. and Associated Group of Hospitals, Bikaner (Rajasthan). These patients were thoroughly investigated by detailed history, clinical examination and routine investigations related to sterility, and excluded from the present study if organic, systemic or pelvic disease was found. The husbands were also examined and investigated including semen examination for normal count/motility.

Twenty-five healthy females were selected as controls who had normal menstrual cycles and had two or more pregnancies without complications.

Endometrium was obtained in premenstrual period and the tissues were fixed in formalin, processed and 5 micron thick sections were stained by Haematoxylin and Eosin and PAS for glycogen (McManus, 1960). Histological dating was done according to the criteria of Noyes (1950). The grading of glycogen content was expressed as follows (Arzae and Blanchet, 1948):

| | | |
|---|---|---|
| 0 | — | Negative reaction |
| + | — | Negative reaction |
| ++ | — | Coarse granules |
| +++ | — | Small masses |
| ++++ | — | Large amounts |

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*Observations*

The distribution of glycogen in controls as well as in stndy cases followed a definite cyclic pattern during menstrual cycle. During early proliferative phase, glycogen was either absent, or present in traces in the basal portions of epithelial cells in the form of very small granules. In late proliferative phase, the amount of glycogen increased, but distribution was similar. In early secretory* phase, the amount of glycogen rapidly increased and was initially present in subnuclear region of glands, shifting later towards the apex and finally in the lumen of glands. In late secretory phase, glycogen was scanty or absent in glands. However, predecidual cells, endothelial cells lining the arterioles and smooth muscle cells of blood vessels were strongly positive for glycogen.

Table I shows morphology of endometrium in controls and patients. Anovulatory cycle, viz proliferative phase was seen in 19% sterile patients as compared to 12% healthy controls. Only 1 healthy control (4%) showed early secretory phase in premenstrual tissues as compared to 39% sterile patients showing early secretory change. Majority of healthy controls (84%) revealed late secretory endometrium while only 40% sterile patients revealed late secretory changes. Tuberculous endometritis was seen in 2% sterile patients.

Table II shows distribution of glycogen in controls and patients. In proliferative phase the distribution of glycogen was

TABLE I

*Morphology of Endometrium in Controls and Cases of Primary Sterility*

| S. No. | Morphology (phase of cycle/specific pathology | Controls (25) | Cases (100) |
|---|---|---|---|
| 1. | Early proliferative | 1 ( 4%) | 8 (8%) |
| 2. | Late proliferative | 2 ( 8%) | 11 (11%) |
| 3. | Early secretory | 1 ( 4%) | 39 (39%) |
| 4. | Late secretory | 21 (84%) | 40 (40%) |
| 5. | Tuberculous endometritis (dating not done) | — — | 2 ( 2%) |

TABLE II

*Amount of Glycogen in Premenstrual Endometrial Tissues*

| Group with number | Amount of glycogen | Early proliferative | Late proliferative | Early secretory | Late secretory |
|---|---|---|---|---|---|
| Controls (25) | 0 | — | — | — | — |
| | + | 1 (4) | — | — | 1 ( 4) |
| | ++ | — | 2 (8) | 1 ( 4) | 2 ( 8) |
| | +++ | — | — | — | 10 (40) |
| | ++++ | — | — | — | 8 (32) |
| Cases of primary sterility (100) | 0 | 5 (5) | — | — | — |
| | + | 3 (3) | 7 (7) | 1 ( 1) | 3 ( 3) |
| | ++ | — | 4 (4) | 15 (15) | 3 ( 3) |
| | +++ | — | — | 13 (13) | 22 (22) |
| | ++++ | — | — | 10 (10) | 12 (12) |

* Figures within parantheses indicate percentage of total cases/controls.

similar in cases and controls—glycogen being absent or present in traces (+) in early proliferative phase. In late proliferative phase some cases (4%) and controls (8%) revealed ++ glycogen, but none revealed +++ or ++++ glycogen.

Only 1 healthy control had early secretory phase endometrium showing ++ glycogen. Amongst 39 primary sterility patients showing early secretory phase, most showed ++ glycogen (15 cases). Other cases revealed +++ (13), ++++ (10) or even + (1) glycogen.

Late secretary phase was seen in 40% patients, which is far less than controls (84%—21 subjects). However, Table III shows clearly that the distribution of glycogen in these cases and controls was almost similar and there was no statistically significant difference in glycogen distribution.

(39%) and tuberculous endometritis in some patients. In other (40%) patients, the endometrium revealed late secretory phase.

The distribution of glycogen followed a definite pattern in relation to menstrual cycle. The distribution of glycogen in endometrial tissues of same histological dating was not different in cases from controls. Hence our study suggests that special staining for glycogen does not provide any additional information over conventional haematoxylin and Eosin stain. While investigating patients having primary sterility, Arronet and Latour (1957) also laid more emphasis on morphological picture of endometrium rather than glycogen content. According to them cases with abnormal endometrium and glycogen failed to conceive, while patients having normal secretory endometrium

TABLE III

*Statistical Evaluation of Glycogen Content of Late Secretory Endometrium*

| S. No. | Group with number | | Amount of glycogen | | | | |
|---|---|---|---|---|---|---|---|
| | | | 0 | + | ++ | +++ | ++++ |
| 1. | Controls | (15) | — | 1 | 1 | 10 | 3 |
| 2. | Primary sterility patients | (40) | — | 3 | 3 | 22 | 12 |
| 3. | Statistical analysis (Chi-square Test) | | | | | | |
| | — p value | | >0.5 | >0.5 | >0.5 | >0.1 | >0.1 |
| | — Significance | | Insig. | Insig. | Insig. | Insig. | Insig. |

Insig. = Insignificant.

*Discussion*

Morphology of endometrium in controls and sterility patients was different. Most of the healthy females (84%) revealed late secretory endometrium in premenstrual period. Endometrium in patients having primary sterility revealed anovulatory cycles (19%), histologic immaturity in the form of early secretory changes with low, normal or high concentrations of glycogen became pregnant.

Our studies suggest that glycopenia in primary sterility patients is not primary, but secondary to morphological changes in the endometrium viz, greater percentage of proliferative and early secretory endometrial tissue in sterility patients. Other workers have attributed great importance

to endometrial glycogen. Glycogen has been considered to be the direct source of nutrient for early conceptus and inadequate glycogen giving rise to "Glycopenic uteri" (Zondek and Stain, 1940; and Zondek and Shapino, 1942) or poor quality endometrium (Hughest *et al* 1950) resulting in death of the ovum either before or after implantation. Glycopenia in primary sterility has been observed by Zondek and Stein (1940). Zondek and Shapino (1942), Hughes (1949), Shahani *et al* (1959), Shetty (1959), Baveja (1972), Tyagi *et al* (1959), and Rohatgi *et al* (1977).

*Summary*

Histology and glycogen content of 100 primary sterility patients and 25 healthy controls in premenstrual endometrium has been studied. Sterility patients revealed a greater percentage of anovulatory cycles and histologic immaturity. Some sterility cases (2%) revealed tuberculous endometritis. However, in endometrial tissues of comparable dating, the distribution of glycogen was similar in cases and controls. Our studies suggest that glycopenia in sterility is not a primary phenomenon and is secondary to histological changes viz. greater percentage of proliferative and early secretory endometrial tissues.

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