STERILITY AND WEDGE RESECTION

by

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Interest in wedge resection of the ovary was greatly heightened by the description of the polycystic ovarian syndrome by Stein and Leventhal. The syndrome is characterised by infrequent periods of amenorrhoea, moderate to severe virilism, occasionally menometrorrhagia, some obesity, sterility and enlarged polycystic ovaries. Because of the lack of any fully recognisable endo-crinopathies, and because of the enlargement of the ovaries, they introduced the operation known as wedge resection. Surprisingly enough the operation which removed the main portion of the ovarian tissue of the patients, who had already an ovarian deficiency, resulted in a prompt appearance of normal menstrual cycle in a majority of patients. Numerous subsequent reports detailing the results of wedge resection of ovaries in polycystic ovaries confirmed the beneficial results of this operation.

Review of literature suggests that any condition associated with anovulatory cycles may lead to development of polycystic ovaries. Such recurrent follicular phases without ovulation and corpus luteum formation are a commonly associated factor in infertility. Ovulatory failure as a cause of infertility occurs in 25-30%. So no wonder in many of these infertility cases one comes across unilateral or bilateral polycystic ovaries. Between 1956 to 1960, in 12 years' time, all cases who have been treated for either primary or secondary sterility in private clinics of the authors were analysed. There were 1,206 cases of infertility, out of which 476 cases were due to ovulatory failure.

Full investigations for sterility including tubal insufflation and endometrial biopsy have shown no abnormality except anovulatory menstrual cycles. Out of these 476 cases of anovulatory cycles, 108 were selected for ovarian resection and ventralsuspension because each one of them had cystic ovaries. Seventy-eight cases were of primary sterility and 30 had secondary sterility.

TABLE I

Symptomatology in the series of 108 cases

	No. of cases	Percentage
Hirsutism	32	29.6 %
Obesity	36	33.3 %
Delayed menarche (beyond 15)	2	1.89%
Irregularity of menstruation since menarche	46	42.4 %

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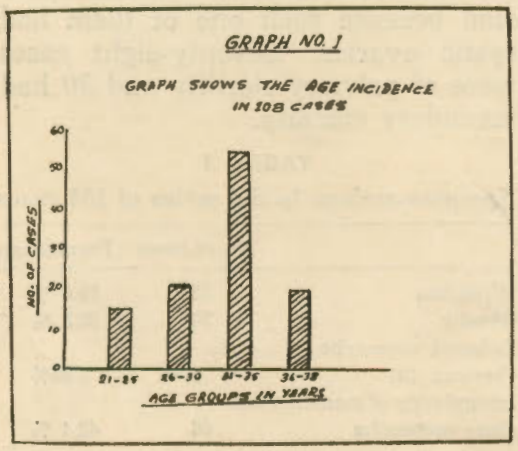
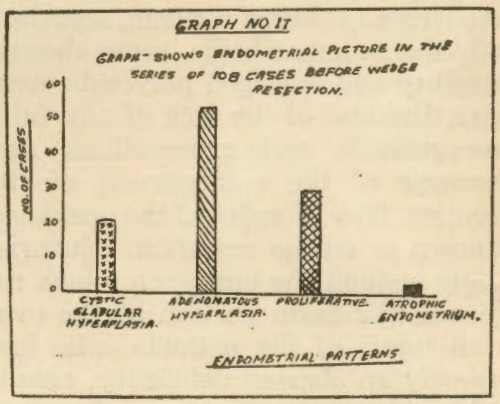
In some patients there were combinations of symptoms.

Severe and pronounced hirsutism was absent; moderate hirsutism was present in 2 cases and border-line hirsutism was present in 30 cases. Obesity was not a prominent feature in the majority of the cases; 33.3% of the cases gave evidence of marked and moderate degree of overweight. Menarche was delayed beyond 15 in 2 patients. In 46 (42.4%) patients the menstrual complaint was of more than three years. All the patients had an initial trial of cyclical estrogen-progesterone therapy or administration of synthetic progesterone to bring about ovulatory cycles and had failed to show any response three months after cessation of the therapy. All the cases had acyclical very marked palm-leaf pattern of cervical mucus. Thirty-two cases had investigation for 17-Ketosteroids. This was within normal limits in all the cases.

Graph I shows the age incidence in 108 cases. The ages of these patients ranged between 21-38. The largest number of patients (70%) belonged to the age group 26-35. Incidentally majority of the cases investigated for sterility were within this age group of 26-35.



Graph II shows the endometrial picture in the series of 108 cases before wedge resection. All the cases showed that there was absence of secretory phase and thus absence of ovulation. There was cystic glandular hyperplasia in 19.4% (21 cases). proliferative endometrium in 27.9% (30 cases); the majority showed adenomatous hyperplasia (54 cases). In 2.7% (3 cases) of these endometrium was atrophic.



There were 3 cases of amenorrhoea and both the ovaries were symetrically enlarged in these. In 75 cases of oligomenorrhoea 58 had bilateral and 17 had unilateral enlargement. In cases of polymenorrhoea 5 had bilateral and 17 had unilateral enlargement of the ovary. In the metropathic type of bleeding bilateral enlargement was noticed in 3 and unilateral in 4 cases. There was only one case of irregular vaginal bleeding. She had bilateral enlargement of ovary. The ovaries were mostly 2-4 times the normal size, distended with follicular cysts, sometimes filled with

haemorrhagic fluid. In our series of cases of wedge resection, 26 pairs of resected portion of the ovaries were examined histologically. The capsule was thickened only in 17 out of 108 cases who had wedge resection. In none of the cases the ovaries were normal in size and appearance. Review of literature shows that typical polycystic ovary is enlarged and possesses a thickened capsule although in some recent series up to 28% of the ovaries were of normal size.

TABLE II

Histological analysis of 26 ovaries taken out in wedge resection

	No. of cases
1. Thickened tunica albugenia	17
2. Graffian follicles	15
3. Corpora lutea	Nil
4. Multiple follicular cysts	26
5. Primordial follicles	3
6. Marked hyperplasia of theca interna	18

In one ovary the microscopic picture gave evidence of combined pathology.

Tunica albugenia was thickened in 17 cases which was mostly due to increase in the fibrous lamella of the ovary. There were graffian follicles in 15 ovaries in all stages of development. There were multiple follicular cysts in all cases. The granulosa cells of the follicles appeared to be normal in most of the cases. The theca interna was markedly hyperplastic in 18 cases (microphotograph No. 1). In some follicles the granulosa cell showed sign of early lutenization (microphotograph No. II).

The correction of the menstrual cycle after wedge resection was seen in 75 cases. Thirty-eight of these had conceived, no response was noted in 33 cases. Out of the 3 amenorrhoeic cases, one ovulated but no response was found in two. Amongst the cases of oligomenorrhoea 28 ovulated and 27 had full-term deliveries or abortions. No response could be found in 33. Of cases belonging to the metropathic type of bleeding, one conceived and one ovulated. No response was observed in four out of seven cases. The single case of irregular vaginal bleeding showed no response after the operative procedure.

TABLE III

Showing correction of menstrual cycle after wedge resection in primary and secondary sterility

Menstrual cycles	No. of cases	Primary sterility-78 cases			Secondary sterility 30 cases		
		Ovulation	Pregnancy	No response	Ovulation	Pregnancy	No response
Amenorrhoea	3	1	-	2	-	-	-
Oligomeno rhoea	75	21	19	13	7	8	7
Polymenorrhoea	22	6	7	3	1	3	2
Metropathic episode	7	-	1	4	1	-	1
Irregular vaginal bleeding	1	-	-	1	-	-	-
Total	108	28	27	23	3	11	10

More than 50% of the patients in the group of primary sterility conceived within 2 years of wedge resection. These patients had sterility of more than 4 years duration and some of them had infertility of 14 years. In the group of secondary sterility 75% of them conceived within 3 years of wedge resection and these cases of secondary sterility were 6 to 14 years' duration. This illustrates that wedge resection was effective in bringing on ovulation and pregnancy, as conception and delivery within such a short period after operative procedure could not be just a coincidental factor.

Discussion

The most common and probably best known condition of the ovary linked to infertility is the bilateral polycystic enlargement, familiarly known, since 1935, as the Stein-Leventhal syndrome. Although polycystic ovaries had been identified prior to the classic description of Stein and Leventhal, no one had previously linked such ovaries with the clinical features of menstrual disturbance, anovulatory sterility, hirsutism and obesity. The clinical pattern of polycystic ovaries encountered among infertile women, admittedly not constant in all patients, embrances chiefly anovulation, longstanding menstrual dysfunction, including oligomenorrhoea, amenorrhoea and bouts of irregular uterine bleeding. Review of literature discloses a wide variation in the frequency of symptoms allegedly associated with polycystic ovaries, varying between 19-77%; dysfunctional type of bleeding, which includes oligomenorrhoea, polymenorrhoea and metropathia, was present in 6-19% (Table IV). In the present series of 108 cases, amenorrhoea was present in less than 3% (2.6%) polymenorrhoea and oligomenorrhoea was present in more than 70%. The wide range observed in the incidence of each symptom probably indicates the difference in the diagnostic criteria employed by individual clinicians. Study of literature indicates than in polycystic ovarian syndrome regular menstruation was present in 7-28% of the cases (Table III). In the series of cases all had menstrual disturbances, 46 cases had irregularity in menstruation, some from the time of menarche, the rest having noticed irregularity for more than three years. The pre-operative endometrium gave no evidence of secretory type of endometrium in any of the cases (Graph II). Evan et al (1960) have shown that about 28% of the ovaries were normal in size. In this series of cases all the cases had either unilateral or bilateral enlargement of ovaries. A great deal of attention has been devoted to the structural changes in the ovary, primarily in the theca interna. They are supposed to be hypertrophic and leutinized in these cases. Thickening of theca interna was seen in 18 out of 26 pairs of ovaries.

Cases of infertility associated with anovulation and polycystic ovaries, grossly palpated as being two or three times larger than average size, or demonstrated by laparotomy, are suitable for bilateral wedge resection. The excision pattern of wedge resection should be longitudinal, uniform in shape, and sufficiently deep to have the knife-like edge of the wedge reach

TABLE IV

Irregular Cycle

Authors	Total No of cases	Polycystic ovaries	Amenorrhoea	Irregular cycle	Normal	Wedge resection	Cycle corrected ovulation	Ovulation	Pregnancy	No response
Jaccobean, R. L.; Dockerty, M. B.	27	27	22	3	2	19	16	-	6	3 Defected 4 Unmarried 3 No response
Allen, W. H.; Woolf, R. B.	22	16	Infertility 13	9	-	22	1	17	6	One recent case with infertility.
Evans, T. N.; Riley, G. H.	40	-	-	40	-	40	36	-	4	2 recent case.
Bailey, K. U.	63	63	29	16	-	63	40	-	16	No clear cut response in 4
Hass, R. L.; Filey, I. H.	12	12	Mostly amenorrhoic			7	-	6	4	Nil
Stein, I. F.; Leventhal, M. L.	7	7	5	2	-	7	5	-	2	Nil

the central portion of the ovary; when complete the remaining portion of the ovary, should be approximately of average size. Recent work of Macdonald and Siiteri (1966) suggested that there is abnormal steroidogenesis in the polycystic ovaries. The enzymatic activity of the follicles depends to a considerable degree on the state of development of the follicle. Early premature leutinization of theca produces abnormal quantity of androgens. Nearly 80% of the oestrogens in these polycystic ovarian syndrome cases may arise from the peripheral conversion of androgen. Reduction of the tissue involved in steroid production by wedge resection results in the lowering of androgen and oestrogen levels. The absence of the inhibitory action of these steroids on the pituitary may then restore the necessary pituitary ovarian balance resulting ovulation.

Table IV shows the results of wedge resection of the ovaries as reported in the literature. There is a great difference in the degree of success in each series of cases. Pregnancy occurred from 13% to 65% of the cases, ovulation from 57% to 77%. Regularity of the cycle was established between 6% to 93%. In the present series regularity was established in 67.4% ovulation in 31 and pregnancy in 38 and no response in 33. We feel that in any of the sterility cases repeated anovulation brings about cystic change in the ovaries without thickness of the capsule; the clinical picture embraces a complex symptomatology where lack of ovulation is the only constant feature. We feel that removal of the abnormal ovarian tissue may change hormonal pattern and bring about regular ovulatory cycle and pregnancy. The results in this small series of cases are quite encouraging. In those cases where pregnancy and ovulation occurred 75% responded within a period of 1-3 years. Wedge resection should be attempted in those cases where attempted hormone therapy fails to establish the ovulatory pattern.

Summary

1. 476 cases of sterility with anovulatory cycle were investigated, out of these 108 were selected for wedge resection of the ovaries and shortening of round ligament to correct retroversion.

2. Seventy-eight cases were of primary sterility and 30 had secondary sterility.

3. Seventy had bilateral and 38 had unilateral polycystic ovaries.

4. Histological analysis of 26 ovaries after wedge resection showed thickened tunica albugina in 17, graffian follicle 15, multiple follicular cyst 26, primordial follicle in 3, and marked hyperplasia of theca interna in 18.

5. Menstrual cycle was corrected after wedge resection in 55 cases of primary sterility and 20 cases of secondary sterility.

6. Twenty-seven cases of the primary sterility and 11 of the secondary sterility had conceived.

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