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CASE REPORT

Unilateral oophorectomy in polycystic ovary syndrome: a treatment option in highly selected cases?

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We performed unilateral oophorectomy (UO) in three patients with polycystic ovary syndrome (PCOS) and long-standing infertility. The indication for performing this procedure was a combination of ovarian pathology and the long-standing infertility. All three patients were resistant to clomiphene citrate and before UO all patients had been treated unsuccessfully with gonadotrophins and in-vitro fertilization. All three patients became ovulatory within the first month after UO. Two patients conceived 11 and 12 months after surgery respectively and delivered healthy babies. Testosterone concentrations decreased in two patients to upper values of the normal range and remained unchanged in one patient. We conclude that restoration of ovulation can be a beneficial side-effect of UO in clomiphene citrate resistant patients with PCOS and long-standing infertility.

Key words: androgens/ovarian pathology/ovulation/pregnancy/surgery

Introduction

Unilateral oophorectomy (UO) was proposed as a surgical treatment for ovulation induction and hirsutism in patients with polycystic ovary syndrome (PCOS) (Hamerlynck, 1982). The author claimed that ovulation was restored after surgery in all 10 treated patients. To the best of our knowledge no other studies concerning UO in patients with PCOS have ever been published. Probably UO was no longer accepted as a treatment option for clomiphene citrate resistant patients with PCOS because of improvement in results of treatment around 1982 with gonadotrophins and in-vitro fertilization. Three treatment cycles with human menopausal gonadotrophins (HMG) had been unsuccessful: two cycles were ovulatory but did not result in a pregnancy, and one cycle was cancelled because of ovarian hyperstimulation. Moreover, s.c. administration of luteinizing hormone releasing hormone (LHRH) during 4 months failed to induce an ovulation. Finally, three cycles of IVF–embryo transfer did not result in a pregnancy. After the IVF–embryo transfer treatment the patient had complaints of chronic right-sided abdominal pain. Repeated transvaginal sonography showed a persistent cyst in the right ovary with a maximum diameter of 27 mm. The patient was carefully counselled about her options: either to perform a simple cystectomy, or to extend this procedure to a total unilateral oophorectomy in an attempt to restore ovulatory function. She decided to undergo UO. Histopathology of the resected ovary showed a benign cyst.

After surgery the chronic abdominal pain disappeared. Within the first month after surgery the patient experienced for the first time in her life regular ovulatory cycles, with ovulations on cycle day 13 every month, confirmed by a biphasic basic body temperature (BBT), transvaginal sonography and midluteal progesterone concentrations...
>20 nmol/ml. Before UO the patient shaved her face and legs every day, but 3 months after surgery shaving was reduced to twice a week. Before UO luteinizing hormone (LH), follicle stimulating hormone (FSH) and testosterone concentrations were 19.3 U/l, 7.0 U/l and 3.2 nmol/l respectively, and after UO, LH, FSH and testosterone concentrations were 11.6 U/l, 4.0 U/l and 3.3 nmol/l respectively. Twelve ovulatory cycles after surgery she conceived and delivered a healthy girl after 40 weeks of amenorrhoea.

**Case 2**

The patient was 36 years old and had suffered from infertility for 18 years at the time of UO. Co-existent subfertility factors were a uterus bicornis and moderate oligoasthenozoospermia in the semen of her husband. Six treatment cycles with HMG had been unsuccessful: four cycles were ovulatory but did not result in a pregnancy and two cycles were cancelled because of ovarian hyperstimulation. Six cycles of IVF–embryo transfer treatment had resulted in three unsuccessful pregnancies. The first pregnancy was a right-sided tubal pregnancy, treated by tubectomy. The second pregnancy ended in a spontaneous abortion after 6 weeks of gestation. The third pregnancy was complicated by severe ovarian hyperstimulation for which the patient was admitted to hospital for 4 days. Two weeks later the patient again was admitted to the hospital suffering from vaginal bleeding and abdominal pain. She aborted on the same day. As the pain increased, a laparoscopy was performed, showing a tordated, cystic, haemorrhagic and necrotic right ovary. The ovary had to be removed by laparotomy. After surgery the pain had disappeared completely. Histopathology confirmed the clinical diagnosis.

Directly after UO the patient had four regular ovulatory cycles of 4 weeks, followed by an amenorrhoea of 4 months. Using a progestagen a withdrawal bleeding was induced. In the next cycle she ovulated spontaneously on cycle day 51 and became pregnant. Unfortunately, transvaginal sonography at 6 weeks of gestation showed a gestational sac and yolk sac without fetal heart beat. The next day the patient had a spontaneous abortion.

Three months after the abortion the basal body temperature (BBT) was monophasic, and 25 mg of clomiphene citrate was prescribed. Thereafter, the patient experienced regular ovulatory cycles with ovulations between cycle days 12 and 15 and she conceived in the third cycle. She delivered a healthy boy after 39 weeks of amenorrhoea.

Before UO mean LH, FSH and testosterone concentrations were 17.2 U/l, 5.0 U/l and 4.1 nmol/l respectively, and after UO mean LH, FSH and testosterone concentrations were 13.5 U/l, 5.5 U/l and 3.8 nmol/l respectively.

**Case 3**

The patient was 30 years old and had suffered from primary infertility for 12 years at the time of UO. A co-existing subfertility factor was her diethylstilboestrol uterus with typical malformations. Six treatment cycles with HMG had all been ovulatory but had not resulted in a pregnancy. Also, three cycles of IVF–embryo transfer had been unsuccessful. Finally, transvaginal interstitial laser treatment (TILT) of both ovaries was performed, but the patient remained anovulatory (Kaaijk et al., 1996). After TILT, clomiphene citrate treatment was repeated and the patient ovulated occasionally on high doses (150 mg) of clomiphene citrate, monitored by transvaginal sonography and BBT. One year after TILT, a hyperechogenic cyst in the left ovary was observed. It increased in diameter up to 25 mm. The patient was then counselled in the same way as the first patient and she also opted for UO. Clomiphene citrate treatment was stopped and the ovary was removed by laparotomy. Histopathology of the resected ovary showed a benign fibroma.

Within the first month after surgery the patient became ovulatory with ovulations between cycle days 18 and 28 as confirmed by transvaginal sonography, biphasic BBT, and midluteal progesterone concentrations >20 nmol/l. At this moment, 14 months after UO, the patient still ovulates every month but has not yet become pregnant.

Before UO mean LH, FSH and testosterone concentrations were 21.1 U/l, 6.1 U/l and 4.8 nmol/l respectively, and after UO mean LH, FSH and testosterone concentrations were 15.3 U/l, 5.8 U/l and 4.4 nmol/l respectively.

**Discussion**

We describe three patients with clomiphene citrate resistant PCOS who underwent UO because of suspected ovarian pathology, i.e. a persistent cyst and chronic abdominal pain (case 1), ovarian torsion after ovarian hyperstimulation syndrome, which was a complication of IVF treatment (case 2), and an ovarian fibroma (case 3). All three patients had long-standing infertility and had been treated unsuccessfully by clomiphene citrate, gonadotrophins and IVF. As a beneficial side-effect all patients became ovulatory after UO. Two patients became pregnant and delivered full term babies.

These results confirm our former findings (Hamerlynck, 1982). UO was then proposed as an alternative surgical treatment to bilateral ovarian wedge resection particularly in order to prevent adhesions connected with the remaining ovary. As far as we know no other studies concerning UO to restore ovulation have ever been published. Probably later on UO was not acceptable as a treatment option for clomiphene citrate resistant patients with PCOS, in view of improved results of treatment with gonadotrophins and IVF and introduction of minimally invasive surgical treatment such as laparoscopic electrocoagulation and laparoscopic laser surgery of the ovaries. Also the fear of premature menopause may have played a role in the non-acceptance of UO. Uncontrolled studies concerning the effectiveness of laparoscopic electrocoagulation and laparoscopic laser vaporization of the ovaries have shown overall ovulation percentages of ~80% of patients and pregnancy rates of ~50% (Gürgan et al., 1994; Kaaijk et al., 1995; Donesky and Adashi, 1995). The duration of restoration of ovulatory function after laparoscopic surgery in patients who do not conceive varies between 2 and 6 months. Thereafter these patients have to be treated again with clomiphene citrate or HMG (Balen and Jacobs, 1994; Fukaya et al., 1995). Although randomized, controlled trials are still lacking, and although the role of adhesion formation and the long-term
follow-up of laparoscopic treatment are not well established, laparoscopic surgery of PCOS is considered the best treatment option for a patient with PCOS who is resistant to clomiphene citrate and/or treatment with gonadotrophins (Cohen, 1996).

However, in contrast to follow-up of laparoscopic electrocoagulation or laser surgery, a 16 year follow-up study of the patients who underwent UO in our hospital in the 1980s has shown that spontaneous ovulation is still restored in all patients. The effect of UO therefore appears to be long-lasting. None of these patients has entered menopause prematurely (unpublished data). The mechanism which causes ovulation induction after ovarian surgery is unknown. Our hypothesis is that ovarian surgery removes the intra-ovarian androgen block responsible for anovulation. UO decreases the total ovarian volume by ~50%, comparable to the amount of ovarian tissue removed by classical wedge resection. In contrast, laparoscopic surgery only destroys a small part of the total ovarian volume and androgen-producing cells. This hypothesis might also explain the difference in duration of restoration of ovulatory function between these two treatments.

All in all, there seems to be consensus that if one decides to embark on surgical treatment for ovulation induction in a particular patient, laparoscopic electrocoagulation or laparoscopic laser surgery of the ovaries should be the treatment of choice. However, in our opinion there are two indications for patients with PCOS when the option of UO can be considered: firstly, in patients with long-standing infertility, failed medical treatment and coinciding ovarian pathology, and secondly, in patients in whom medical treatment and laparoscopic surgery of the ovaries has failed.

References

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