Cases report

LAPAROSCOPIC GONADECTOMY IN 46,XY GONADAL DYSGENESIS

Opas Sreshthaputra, M.D., Teraporn Vutyavanich, M.D.

Division of Reproductive Medicine, Faculty of Medicine, Chiang Mai University

Abstract We reported a case of a 17 year-old female, who presented with primary amenorrhea. She had normal female external genitalia and a 46,XY karyotype. Hormone profiles and laparoscopic findings confirmed a diagnosis of 46,XY gonadal dysgenesis (Swyer syndrome). Prophylactic gonadectomy was performed laparoscopically to prevent the risk of malignant germ cell tumor. Current management of this rare syndrome was reviewed. Chiang Mai Med J 2007;46(1):39-43.

Keywords: 46,XY gonadal dysgenesis, Swyer syndrome, gonadectomy

Swyer syndrome, also known as XY pure gonadal dysgenesis, is a condition in which an individual possesses a 46,XY karyotype and female external genitalia. The syndrome is estimated to occur in less than one percent of the population. Women with this syndrome have streak gonads and they usually present with delayed puberty. If the diagnosis is not made until early adulthood, the risk of malignant change in the streak gonads is around 20-30%. Prophylactic gonadectomy is, therefore, recommended at the time of diagnosis.

Laparoscopic surgery now plays an important role in modern gynecology. It has several advantages over conventional exploratory laparotomy, such as less surgical risk, smaller surgical scars, shorter recovery time and hospitalization, and an earlier return to normal activity. In the past, exploratory laparotomy was recommended for gonadectomy in all such patients. In this short communication, we report a rare case of Swyer syndrome that was successfully managed by laparoscopic gonadectomy.

Case report

A 17-year-old female presented with primary amenorrhea. She had no breast development and no axillary or pubic hair. She was studying in secondary school and had normal intelligence. Her 22-year-old sister had menarche at 15 years of age.

Our subject was 172 cm tall and weighed 65 kg. Her physical examination revealed a...
normal female appearance. Her breasts were at Tanner stage 2. There was no pubic or axillary hair. No mass was palpated at the labia majora or along both inguinal canals. Other physical examinations were normal. Her external genitalia was normal female. Neither normal uterus nor pelvic mass could be palpated by per rectal examination. A per vaginal examination was not performed because the patient was a virgin.

Her karyotype was 46,XY. Reproductive hormone profiles revealed an FSH level of 80.58 IU/L, LH 23.26 IU/L, prolactin 11.81 ng/mL, estradiol 8.0 pg/mL, testosterone 0.145 ng/mL, androstenedione (ADD) 0.86 ng/mL, dehydroepiandrosterone sulfate (DHEAS) 2.55 ng/mL, 17-hydroxyprogesterone (17-OHP) 0.8 ng/mL and beta human chorionic gonadotropin (bHCG) of less than 1 IU/L.

A provisional diagnosis of 46,XY gonadal dysgenesis was made and a laparoscopic gonadectomy was scheduled to remove the intra-abdominal streak gonads. At the time of hospitalization, she had an HCG stimulation test. Five thousand IU of urinary HCG (Pregnyl 5000 IU, Organon, the Netherlands) were injected intramuscularly, and blood levels of testosterone and ADD were measured before hCG injection, and 1 and 3 days after the injection. The levels are shown in Table 1.

### Operative Laparoscopic Technique

The details of laparoscopic gonadectomy have been previously reported. (4-10) In brief, the patient was placed in the dorsal lithotomy position. After induction of anesthesia, carbon dioxide was introduced into the peritoneal cavity through a Verres needle, which was placed slightly below the umbilicus. A four-port laparoscopic technique was employed. The first 10-mm port was made slightly below the umbilicus to accommodate a 10-mm endoscope. The second and the third 5-mm ports were placed lateral to the rectus sheath at a level between the umbilicus and the anterior superior iliac spines on both sides. The fourth 5-mm port was made in the midline in the suprpubic region. The patient was then turned into the Trendelenberg position, to allow the bowel to fall into the upper abdomen.

A small uterus was found in its usual position in the pelvis, with both fallopian tubes normal. Instead of normal gonads, there were two streak gonadal s lying alongside the tubes, measuring approximately 1x2x4 cm each. Other intra-abdominal organs were unremarkable. The gonadal streaks and fallopian tubes on each side were resected together, using bipolar coagulation and sharp dissection. The tissues were put into a Suandok plastic endobag and removed through the umbilical port.

All trocar ports were closed layer by layer with absorbable suture and the skin was closed subcutaneously. After the operation, a rigid hysteroscope was passed into the vagina to confirm the presence of the normal cervix. The vaginal mucosa was found to be normal and a small cervix was seen at the apex of the vagina.

The hospital stay was uneventful and the patient was discharged 2 days after the operation. The histology of the removed tissues revealed streak gonads and unremarkable fallopian tubes. No evidence of germ cell tumor was present in both streaks gonadal.
The patient returned for follow-up 2 weeks after the operation. She was feeling well and already back at school within a week after the operation. Premarin tablets (0.625 mg) were prescribed once a day for hormone replacement.

Discussion

This patient presented with primary amenorrhea. She had no stigmata of Turner’s syndrome. Her secondary sexual development was minimal, with Tanner stage II of the breasts and no axillary or pubic hair. Her hormone profiles showed low levels of sex steroids, very high levels of gonadotropins and a normal level of prolactin. The karyotype was that of a normal male. Clinically, a diagnosis of 46,XY gonadal dysgenesis was most likely.

The human chorionic gonadotropin stimulation test is a useful diagnostic tool to evaluate Leydig cell function, especially in the prepubertal period.\(^\text{11,12}\) The level of testosterone and its immediate precursor (ADD) after hCG stimulation can help distinguish patients with defects in testosterone biosynthesis at the 17 beta-hydroxysteroid dehydrogenase level from those with primary hypogonadism or androgen insensitivity.\(^\text{12}\) The response of testosterone production is normal in androgen insensitivity, but absent in testicular failure. In the enzymatic defect in testosterone biosynthesis, the level of ADD is elevated, while the level of testosterone is low or low-normal. In this case, the levels of testosterone and ADD were lower than in normal females and they did not increase after hCG stimulation.

At operation, streak gonads were found on both sides, with a small uterus and normal fallopian tubes. The operative findings agreed with the result of the hCG stimulation test and were compatible with the absence of the testis and mullerian inhibitory factor (MIF) secretion. The diagnosis of 46,XY pure gonadal dysgenesis (Swyer syndrome) was, therefore, confirmed.

This disorder is due to a failure of testicular development despite the presence of a normal male karyotype. Approximately 14% of patients have mutations in the SRY gene.\(^\text{13}\) In this disorder, the risk of malignant germ cell tumor in the streak gonads is as high as 20-30%,\(^\text{1,2,14}\) but Uehara et al.\(^\text{15}\) reported a higher risk in four of their six reported cases. The most common cell type is gonadoblastoma, but dysgerminoma, seminomas and other embryonal carcinomas are also encountered.\(^\text{1,16}\) Gonadectomy, to prevent malignancy transformation, is recommended as soon as the diagnosis is made.

Laparoscopic bipolar cauterization and harmonic scalpels are as effective for hemostasis as other techniques used in conventional surgery. Laparoscopy, therefore, offers a safe means to perform many types of pelvic operation. In addition, laparoscopic surgery requires a shorter hospital stay, a shorter recovery period and the surgical scars are cosmetically superior to the conventional laparotomy. In young patients (children and adolescents), laparoscopic surgery has also been shown to cause less psychological trauma.\(^\text{1,3}\) Laparoscopic gonadectomy should, therefore, be the first line of treatment in such patients. As the streak gonads are usually found very close to the fallopian tubes, simultaneous removal of both structures by adnexectomy is necessary.\(^\text{1,3}\) The preservation of the uterus is mandatory for future fertility. With the current advance in assisted conception technology, patients with 46,XY gonadal dysgenesis can carry a pregnancy through the use of donor oocytes.\(^\text{17,18}\)
Hormone replacement therapy is essential for the patient to enable her to undergo normal pubertal development. To mimic the normal sequence of hormone production at puberty, the treatment should be started with a low dose of estrogen alone (0.3 mg conjugated equine estrogens or 0.5 mg micronized estradiol) for 6-12 months. After this period of unopposed estrogen or when vaginal bleeding commences, cyclic progestins should be added. At this time, higher doses of estrogen (1.25-2.5 mg conjugated equine estrogens or 2-3 mg micronized estradiol) are required to achieve maximal bone and breast development. Alternatively, low-dose combined pills can be used instead of sequential estrogen and progestins. Hormone replacement should be continued up to the time of the natural menopause. This patient had normal adult height and some degree of breast development, and the higher initial dosage of estrogen (1.25 mg conjugated equine estrogens) was administrated for six months before adding the cyclic progestin.

References

Laparoscopic gonadectomy in XY gonadal dysgenesis

