

Case Report

High orchiectomy and ipsilateral testicular sperm extraction in a man with a testicular tumor and Klinefelter syndrome: A case report

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Abbreviation & Acronym

TESE = testicular sperm extraction

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Introduction: Testicular epidermal cysts in Klinefelter syndrome are very rare. We report a case of Klinefelter syndrome associated with a testicular epidermal cyst. To our knowledge, this is the first report showing successful spermatozoa retrieval from the affected testis.

Case presentation: A 25-year-old married man was referred to our hospital with right scrotal induration, which was in lower pole of the right testis. Testicular cancer tumor markers were normal; endocrinological findings indicated hypergonadotropic hypogonadism. Semen analyses revealed azoospermia. Preoperative chromosome test result: 47, XXY karyotype; ultrasonography report: 1.9-cm internal heterogeneous echoic mass in the right testis (malignancy not discarded). Because the patient hoped for children, he underwent high orchiectomy with ipsilateral testicular sperm extraction (200 spermatozoa from normal testicular tissue) for future fertilization procedures. Tumor pathology was an epidermal cyst.

Conclusion: While performing orchiectomy for testicular tumors, sperm retrieval should be attempted from normal tissues in patients planning for children.

Key words: epidermal cyst, epidermoid cyst, Klinefelter syndrome, testicular tumor.

Keynote message

Testicular epidermal cysts in Klinefelter syndrome are very rare. If malignancy was not ruled out preoperatively, high orchiectomy should be conducted. When the patient hopes for children, simultaneous testicular sperm extraction from the normal testicular tissue on the ipsilateral side should be attempted.

Introduction

Klinefelter syndrome is the most common chromosomal disorder causing male infertility occurring in approximately one out of 500 men.¹ Most cases present a non-mosaic 47, XXY karyotype.² Testicular epidermal cysts are rare tumors accounting for approximately 1% of all testicular tumors.³ We describe a case of Klinefelter syndrome and testicular epidermal cyst. To our knowledge, this is the seventh English literature report and the first one to show successful retrieval of spermatozoa from the affected testis.

Case presentation

A 25-year-old married Japanese man (height 188 cm, weight 76.1 kg, body mass index 21.5) was referred to our hospital with a painless, right scrotal induration in his right testis discovered 1 month previously with no other subjective symptoms or notable histories.

On physical examination, the pubic hair and penis had a normal aspect (Tanner's stage was 5 each), but the atrophic testes had volumes of 8 ml on the left side and 12 mL on the right side (with an induration in the lower pole).

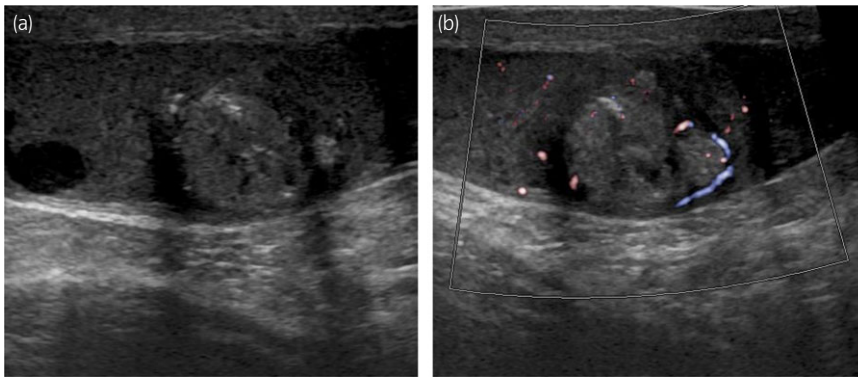


Fig. 1 The ultrasonography showed a 1.9-cm internal heterogeneous echogenic mass with low echoic margin in the right testis (a). In the Doppler mode, the presence of blood flow inside the tumor was ambiguous, but a signal was seen at the periphery (b).

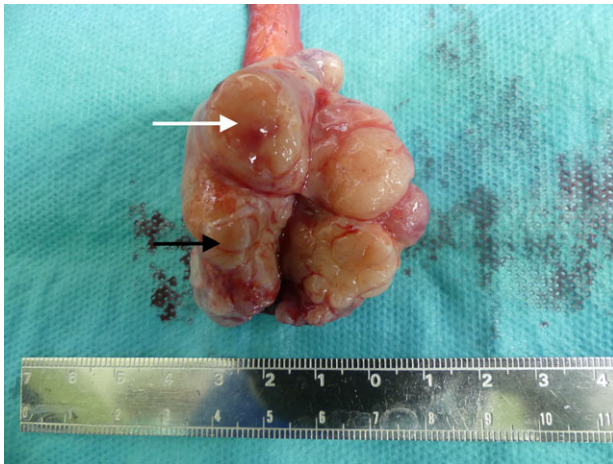


Fig. 2 A 1.5-cm white tumor in the lower pole of the right testis (black arrow) and normal testicular tissue with atrophic seminiferous tubules in the upper half (white arrow).

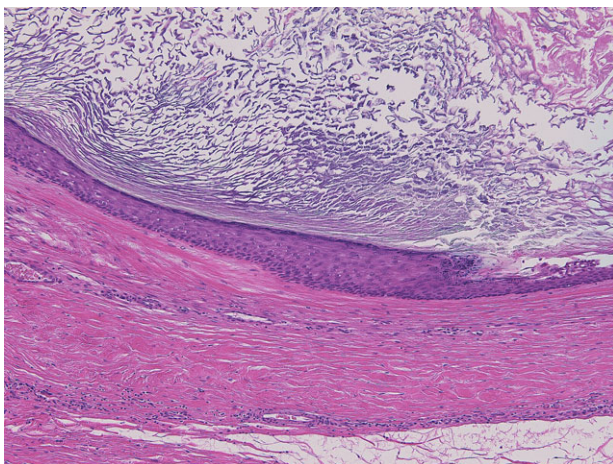


Fig. 3 The pathological finding of the tumor showed a cyst wall covered with keratinizing squamous epithelia.

Testicular cancer tumor markers were normal (human chorionic gonadotropin <0.1 mIU/mL; alpha-fetoprotein 3.1 ng/mL; lactate dehydrogenase 132 U/L); endocrinological findings indicated hypergonadotropic hypogonadism (luteinizing

hormone 21.3 mIU/mL, follicle-stimulating hormone 58.0 mIU/mL, total testosterone 333 ng/dL). Two separate semen analyses revealed azoospermia.

Ultrasonography report showed a 1.9-cm internal heterogeneous echogenic mass with low echoic margin in the right testis. In the Doppler mode, blood flow presence inside the tumor was ambiguous, but a signal was seen at the periphery (Fig. 1).

Malignancy was not ruled out; we planned to perform high orchiectomy. Because the patient hoped to have children, we decided to simultaneously perform a TESE from the normal testicular tissue.

In February 2018, the patient underwent a high orchiectomy with incision along the inguinal canal. Right spermatic cord was ligated and cut at the internal inguinal ring level. Immediately after orchiectomy, we sectioned the testis sagittally *ex vivo*. We observed a 1.5-cm white tumor in the lower pole of the right testis and normal testicular tissue with atrophic seminiferous tubules in the upper half (Fig. 2). Approximately 200 motile and immotile spermatozoa were extracted and cryopreserved.

Preoperative chromosomal testing results showed a 47, XXY karyotype in 20 of 20 cells.

Pathological finding of the tumor showed a cyst wall covered with keratinizing squamous epithelia (Fig. 3), without malignancy evidence, diagnosed as an epidermal cyst. The remaining testicular tissue of upper half showed atrophy of most seminiferous tubules hyalinized with Leydig cell hyperplasia. Only Sertoli cells (no germ cells) were apparent in the seminiferous tubules observed. Mean Johnsen's score count was 1.1. The patient's wife is planning to undergo oocyte retrieval and intracytoplasmic sperm injection in the future. TESE in the left testis can be scheduled if required.

Discussion

Klinefelter syndrome is associated with an increased risk of malignant diseases including testicular germ cell tumor due to inherent endocrinological abnormalities of the hypergonadotropic hypogonadism.

Association with malignancies is often explained by testicular dysgenesis syndrome hypothesis,⁴ genetic defects and polymorphisms and environmental factors including endocrine disruptors lead to disturbances of Sertoli and peritubular cell

Table 1 Characteristics of seven patients with Klinefelter syndrome and epidermal cyst

Patient	Authors	Age	Chief complaint	Side	Treatment	Size	Karyotype
1	Goldstein <i>et al.</i>	19	Cryptorchidism	Left	Orchiectomy	2.5	47, XXY
2	Sasagawa <i>et al.</i>	30	Infertility	Right	Orchiectomy	3.0	47, XXY
3	Sasagawa <i>et al.</i>	29	Infertility	Right	Orchiectomy	–	47, XXY
4	Baniel <i>et al.</i>	17	Scrotal induration	Right	Orchiectomy	1.8	47, XXY
5	Kurzrock <i>et al.</i>	6	Scrotal induration	Bilateral	Orchiectomy	1.0	47, XXY
6	Yoshida <i>et al.</i>	38	Infertility	Right	Orchiectomy	4.0	47, XXY
7	Takehima <i>et al.</i>	25	Scrotal induration	Right	Orchiectomy	1.5	47, XXY

functions with decreased Leydig cell function, resulting in impaired germ cells and tumors.

Testicular tumors are often discovered during male infertility screenings; azoospermia associated with Klinefelter syndrome may be found during testicular tumor screening.

Suspected malignancy led to a semi-urgent operation; we did not wait for chromosome test result before operating. Intraoperative rapid pathological diagnosis was an option to preserve the testis in absence of malignancy; the malignancy could not be completely ruled out and azoospermia due to Klinefelter syndrome was strongly suspected. Therefore, we planned sperm retrieval from normal seminiferous tubules right after the orchiectomy. Given the possibility of finding spermatogenesis in the contralateral left testis, this procedure was not exactly “onco-TESE”;⁵ it was similar and achieved spermatozoa preservation. The main purpose was to remove the testicular tumor (semi-urgent case); we did not attempt TESE in the contralateral testis.

Testicular epidermal cysts account for approximately 1% of all testicular tumors.³ Most of them occur in men between 10 and 40 years, presenting as painless testicular induration found incidentally. Ultrasonography demonstrates an avascular, mostly lamellated heterogeneous internal echotexture, with hypoechoic and hyperchoic concentric rings (onion-ring or target appearance). Histologically, five Price criteria can be used for the diagnosis: (i) cyst located within the testis parenchyma; (ii) cyst lumen filled with keratinized debris; (iii) cyst wall comprising fibrous tissue with complete or incomplete squamous epithelial inner lining; (iv) lacking teratomatous elements or adrenal structures (sebaceous glands or hair follicles) within the cyst wall or testicular parenchyma; and (v) no scar in the remaining testicular parenchyma.⁶

We found seven cases of testicular epidermal cyst associated with Klinefelter syndrome^{7–11} (Table 1). Patients' age ranged from 6 to 38 years; the chief complaint was infertility in three cases^{8,11} and scrotal induration in the other three.^{9,10} In all cases, Klinefelter syndrome karyotypes were non-mosaic (47, XXY); patients underwent orchiectomy treatments.

Reports on epidermoid cysts have shown that one-fifth of cases underwent cyst enucleation preserving the testis, while the rest underwent orchiectomy because malignancy including immature teratoma was not discarded,¹² as in this case. This is the first study reporting successful spermatozoa retrieval with simultaneous orchiectomy in a patient with testicular epidermal cyst and Klinefelter syndrome. Sperm retrieval rate in Klinefelter syndrome is approximately 65%,^{13,14} but may

be lower in single testis post orchiectomy cases. Serum testosterone level decreases after TESE in such cases. Likely as in onco-TESE cases, sperm should be retrieved from normal testicular tissue in the cancerous testis along with orchiectomy.

Conclusion

We described a case of Klinefelter syndrome with successful TESE along with orchiectomy for an ipsilateral testicular tumor. Sperm retrieval from normal testicular tissue in cancerous testes is possible for patients hoping to have children.

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Conflict of interest

The authors declare no conflict of interest.

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