



Large Seminoma in a Reproductive-Age Woman with Complete Androgen Insensitivity Syndrome: A Case Report

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KEYWORDS

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ABSTRACT

Complete Androgen Insensitivity Syndrome (CAIS) is a rare X-linked recessive disorder in individuals with XY karyotype who are phenotypically female. This research presents a 38-year-old woman who exhibited primary amenorrhea and a longstanding growing inguinal mass, later diagnosed as seminoma. Physical and gynecological examinations revealed absent internal female reproductive organs. Imaging showed large cystic and solid masses in the abdomen and inguinal canal. Histological findings were consistent with seminoma, and karyotyping confirmed an XY chromosome pattern. Hormonal analysis supported the diagnosis, showing elevated testosterone and normal estradiol levels. Surgical excision of the masses was performed successfully. This report emphasizes the importance of early detection of CAIS to prevent malignancy risk from undescended testes, which is increased in late adulthood. The novelty of this case lies in the advanced age of diagnosis and the size of the tumor, demonstrating that CAIS can remain unnoticed for decades without intervention. Findings highlight the clinical urgency for thorough evaluation in adolescent girls with amenorrhea, including hormone analysis and karyotyping. The implication of this research supports the inclusion of CAIS screening protocols in primary healthcare systems to reduce morbidity and cancer risk.

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INTRODUCTION

Complete Androgen Insensitivity Syndrome (CAIS) is a disorder of androgen hormone resistance that is marked by a female phenotype in individuals with an XY karyotype (Herrera-Gómez et al., 2016; Kim et al., 2011; Tsubamoto et al., 2013). The underlying etiology of CAIS is a loss-of-function mutation in the androgen receptor (AR) gene. This AR gene is localized on the long arm of the X chromosome (Xq11-13). The typical clinical feature of CAIS is primary amenorrhea in adolescents or inguinal swelling in infants (Team, 2008; Udasimath Shivakumarswamy et al., 2012). Women with CAIS experience appropriate breast development and pubertal growth but do not menstruate. The development of secondary sexual characteristics, dependent on estrogen, occurs due to the excess aromatization of androgens. Pubic and axillary hair are typically absent or very sparse (Atsumi & Nakahara, 2012).

CAIS is usually diagnosed during puberty when primary amenorrhea or inguinal hernia is observed. If not diagnosed early, there is a risk that undescended testes could develop into malignancy. The risk of malignancy increases with age in patients with CAIS (Kim et al., 2011).

This research presents a 38-year-old woman who exhibited primary amenorrhea and a longstanding growing inguinal mass, later diagnosed as seminoma. While previous studies such as Kim

et al. (2011) and Manuel et al. (1976) have discussed the risk of seminoma in patients with Complete Androgen Insensitivity Syndrome (CAIS), this case report is novel in documenting a rare instance of a *large seminoma* in a 38-year-old undiagnosed woman, emphasizing the consequences of delayed diagnosis and treatment. Unlike prior literature that focused on younger patients or early interventions, this study presents a uniquely advanced presentation of CAIS discovered incidentally through a growing inguinal mass and later confirmed via histology and karyotyping. The report highlights the significance of routine karyotyping and early screening in amenorrheic women to prevent malignancy progression—a clinical aspect underemphasized in earlier works (Abratt et al., 1992; Cheikhelard et al., 2008).

METHOD

This study utilizes a qualitative descriptive case report methodology aimed at documenting and analyzing a rare presentation of a large seminoma in a patient with Complete Androgen Insensitivity Syndrome (CAIS). The subject was a single patient, a 38-year-old phenotypic female who presented with primary amenorrhea and a progressively growing inguinal mass. This research follows a clinical case study design, where the patient's detailed clinical history, physical examination, imaging results, histological findings, hormone assays, and chromosomal analysis were compiled to form a comprehensive diagnostic profile (Cools et al., 2017; Ejike et al., 2023).

The data population comprises clinical information and test results drawn directly from this patient. Given the case-specific nature of this research, the data sample consists of only one subject. No probabilistic or non-probabilistic sampling technique was required. Research instruments included physical examination tools, ultrasound and CT imaging, histopathological staining and microscopy, karyotyping kits, and hormonal assay equipment. Validity was ensured by using established diagnostic standards for CAIS, and reliability was supported through repeat imaging and histopathological verification from independent lab analyses (Kong et al., 2022; Lami et al., 2024; Locke & Hoyt, 2023).

Data collection procedures included a full anamnesis, physical and gynecological examinations, diagnostic imaging (CT, abdominal ultrasound, transvaginal ultrasound), surgery (mass excision), and post-operative laboratory analyses (histology, karyotyping, hormone levels). The entire workflow followed ethical clinical protocols approved by the treating hospital. Data were analyzed descriptively and supported by visual evidence (CT scans and histology images). The Microsoft Office Suite was used to compile, present, and format the clinical data. The analysis focused on symptom chronology, clinical-pathological correlation, and outcome implications, contributing to the broader understanding of late-diagnosed CAIS and its oncological risks.

RESULT AND DISCUSSION

Case Illustration

A 38-year-old woman presented with complaints of a growing lump in the left inguinal area for the past 10 years. Initially, the lump was intermittent but had been steadily enlarging over the last 2 years. One year prior, a lump started appearing in the lower left abdomen. The lump was painless and was not accompanied by fever or digestive disturbances. The patient had a history of type 2 diabetes mellitus.

The patient was then referred to the Obstetrics and Gynecology department because she had never menstruated in her life. According to the patient's account, she had previously consulted a midwife regarding her lack of menstruation, and the midwife had stated that her vaginal opening was not connected to the uterus. However, she did not seek further medical treatment until the lump continued to grow and caused discomfort.

The patient is the first-born child, and her younger sister is a woman who has already menstruated. The patient had been married once but divorced after two years of marriage.

Physical examination revealed normal vital signs, a BMI of 22.5 (weight: 60 kg, height: 163 cm), and Tanner stage P2M3. A 6x6x5 cm lump was palpable in the left iliac region. Vaginal examination revealed an asymmetric vulva with no cervix and no palpable corpus uteri.

Images and Diagnostic Findings

- **CT Scan:** The CT scan showed a cystic lesion with solid components, well-defined boundaries, and regular edges in the lower abdominal cavity, connected to the left inguinal area.
- **Abdominal Ultrasound:** Two cystic masses were seen: one in the left abdomen measuring 15x11 cm, pushing against the left kidney, and another in the left pelvis extending along the left inguinal canal measuring 14x10 cm.
- **Transvaginal Ultrasound:** The ultrasound showed a vaginal stump, with no uterus or ovaries visible.

The patient was diagnosed with primary amenorrhea and suspected CAIS, and karyotype and reproductive hormone tests were planned.

Image 5. CT Scan



Figure 1. No uterine structure

The mass was then excised from the left inguinal and abdominal regions. During the excision, it was found that both lumps located in the left inguinal and left abdominal areas were connected through the left inguinal canal. The mass in the left abdomen contained fluid, while the mass in the left inguinal area was a solid mass measuring 5x3 cm.

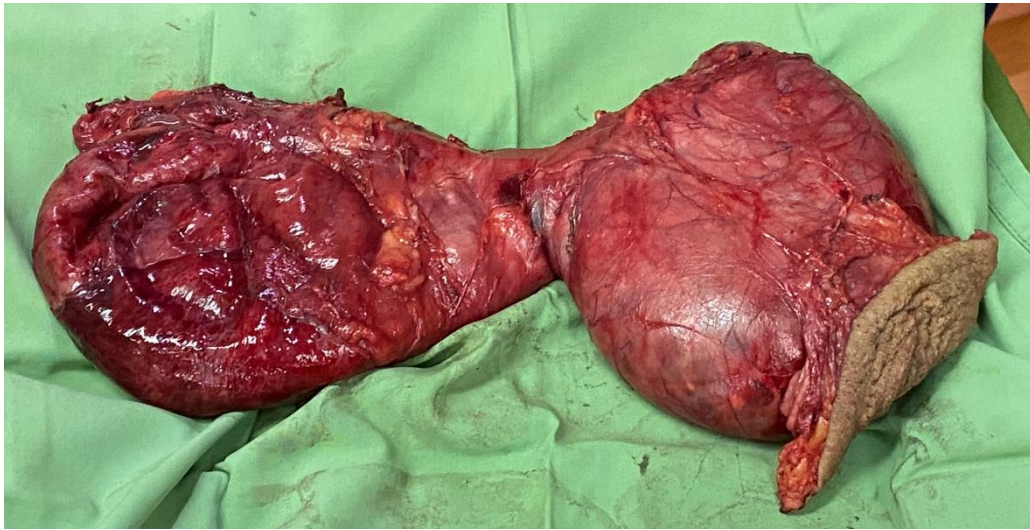


Figure 2. Mass in abdomen and left inguinal



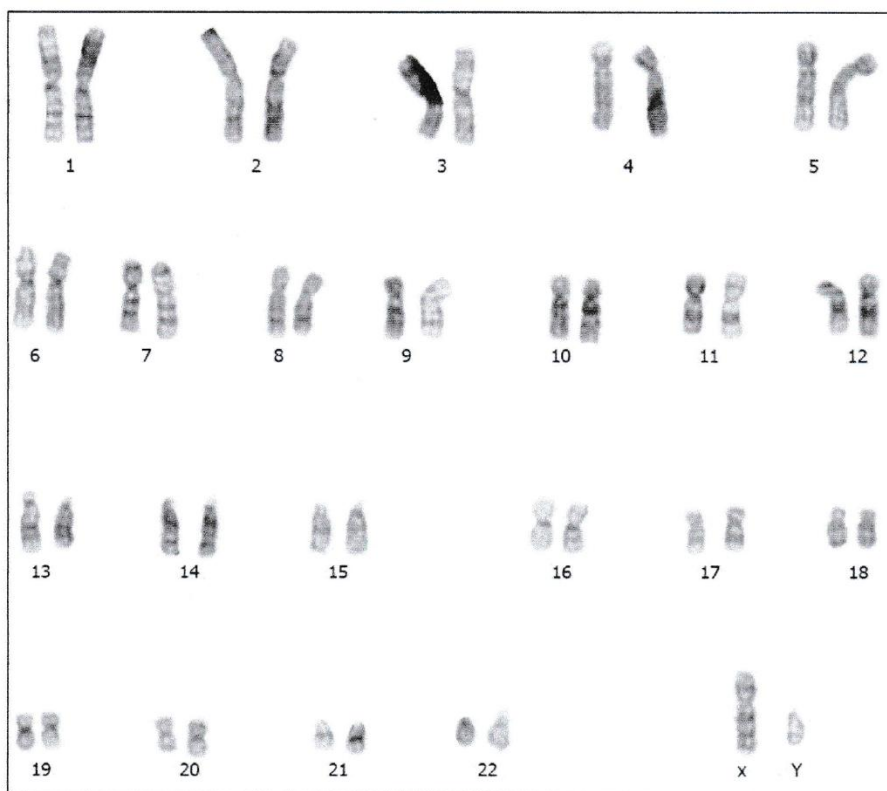
Figure 3. Mass in abdomen and left inguinal

Histology and Karyotype Analysis

After excision of the lump, histological examination revealed a lobulated tumor structure separated by fibrous septa. Tumor cells within the lobules were dispersed diffusely or formed an infiltrative alveolar structure between the stroma. The tumor cells were medium-sized, uniform, with round to pleomorphic nuclei, vesicular chromatin, and prominent nucleoli. Clear cytoplasm, some eosinophilic, with 2-3 mitoses per high-power field, was observed. Mature lymphocytes were found mixed with neutrophils. The fibrotic stroma showed areas of necrosis and vascular proliferation, some of which were hyperemic. Tumor cell emboli were noted within blood vessels, along with focal calcifications. Karyotype examination revealed a chromosomal composition of 44 autosomes and XY sex chromosomes.

Table 1. Hormone Examination

	Result	Normal value
Anti Mullerian Hormone	3.90 ng/mL	0.777-5.240
FSH	26.42 mIU/mL	
Estradiol	37 pg/mL	
Testosteron	90.81 ng/dL	
SHBG	31.09 nmol/L	14.1-68.9 nmol/L



Nomenclature

46,XY

Figure 4. Karyotype result

Discussion

Primary amenorrhea in women can be caused by various factors, such as abnormalities in the anterior pituitary, hypothalamus, uterus, or ovaries. A woman should typically begin menstruating by

the age of 12-13 years. Therefore, if menstruation has not occurred by the age of 14, further investigation should be conducted to determine the cause of amenorrhea. In this patient, medical attention was sought when she experienced amenorrhea, and it was noted that she had no uterus. However, further medical intervention was not pursued until the lump grew larger and caused discomfort, leading to delayed diagnosis. Complete Androgen Insensitivity Syndrome (CAIS) is an uncommon hereditary condition characterized by a lack of response to androgens, hormones essential for the development of male sexual traits. Individuals with Complete Androgen Insensitivity Syndrome (CAIS) possess an XY karyotype; nevertheless, their bodies are incapable of responding to androgens, resulting in the manifestation of a feminine phenotype despite the presence of male chromosomes. Women with Complete Androgen Insensitivity Syndrome (CAIS) generally exhibit primary amenorrhea resulting from the absence of a functional uterus and frequently have a history of inguinal hernia or other abdominal tumors associated with undescended testes (Fraccascia et al., 2024; Kapama et al., 2022).

The patient arrived with a left inguinal tumor in the lower abdomen that had been steadily growing over several years. Two classic symptoms of CAIS are amenorrhea and the patient's infertility resulting from absent a uterus. A noteworthy discovery suggestive of undescended testes, a disorder usually linked with CAIS, is the identification of a solid mass in the left inguinal area and a cystic mass in the abdomen connected via the inguinal canal. Mass excision followed by histological study turned out a seminoma, a common tumor type connected with CAIS. Physical examination showed that breast development (M3) had occurred, while pubic hair growth was minimal (T2). Breast development is a complex process involving both estrogen and androgen hormones. Estrogen stimulates breast growth, while androgens inhibit it. Pubic hair growth is primarily influenced by androgens. Therefore, the development of breasts without pubic hair growth in this patient was an early sign of estrogen effect on her body, with no androgenic influence (Dimitrakakis et al., 2009).

The vaginal examination revealed a blind-ending vagina and the absence of the cervix. Ultrasound showed no uterus. Hormone levels, particularly testosterone, were elevated compared to normal female levels. Karyotyping confirmed an XY karyotype, leading to a diagnosis of Complete Androgen Insensitivity Syndrome.

In women, inguinal hernias should always be suspected, as gonads may be unexpectedly found during hernia repair. If detected early, gonadectomy should be considered. If undiagnosed in childhood, gonadectomy should be performed in early adulthood, as the risk of gonadal tumor development increases by 30% in adulthood. Gonadal tumors associated with CAIS are typically seminoma type 2, non-seminoma, or dysgerminom. Age greatly raises the likelihood of gonadal cancer in CAIS sufferers, which emphasizes the need of early identification and treatment. Reducing the risk of cancer—especially testicular cancer—often seen in males with undescended testes depends on regular monitoring and appropriate intervention including gonadectomy (Cheikhelard et al., 2008; Abratt, 1992).

Histologically, seminoma is characterized by lobular cell configurations, eosinophilic cytoplasm, well-defined cell membranes, polygonal nuclei with one or more prominent central nucleoli, and clear cytoplasm with some eosinophilic areas. Lymphocytic infiltration is also present, which aligns with the histological findings in this patient (Manuel et al., 1976).

This case emphasizes the need of karyotyping and hormone testing for a firm diagnosis. People with Complete Androgen Insensitivity Syndrome (CAIS) usually have high testosterone levels; but, the lack of androgen responsiveness causes female secondary sexual characteristics including breast

development while pubic and axillary hair growth is absent. The histological study verified the existence of seminoma, a germ cell tumor usually linked with CAIS.

This case highlights the consequences of delayed diagnosis in CAIS, which may lead to inadequate treatment and the potential development of malignancy from undescended testes.

CONCLUSION

This research sheds light on the serious implications of delayed diagnosis in Complete Androgen Insensitivity Syndrome (CAIS), particularly the development of gonadal tumors such as seminoma. The 38-year-old patient exhibited classic signs of CAIS, including primary amenorrhea, lack of pubic hair, and an inguinal mass, which ultimately proved to be malignant. Despite the typical presentation, the diagnosis was significantly delayed, underscoring the need for early recognition and intervention. Future research should focus on establishing national screening protocols for adolescents presenting with primary amenorrhea, integrating routine karyotyping and hormonal profiling to detect CAIS early. Additionally, longitudinal studies are needed to evaluate the psychosocial and reproductive outcomes of patients diagnosed and treated in different stages of life.

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