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CASE REPORT

Diagnostic Challenges in Donor Studies: A Case of Buried Penis Secondary to Giant Inguinoscrotal Hernia and Scrotal Lymphedema

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Abstract

Buried or hidden penis, also known as buried or hidden penis syndrome, is a condition where the penis is normal in size, but concealed beneath the abdomen, thigh, or scrotum. Seen in children due to congenital abnormalities, post-circumcision scarring, or obesity, buried penis in adults is less well-defined and often linked to obesity, prior surgical history, or lymphedema. Diagnosis is primarily clinical and relies heavily on detailed patient history and thorough physical examination, which is unattainable when studying a donor.

We report a case of an 86-year-old male donor whose penis was not externally visible as it was buried inside dilated scrotal sac secondary to lymphedema in the setting of a giant indirect inguinoscrotal hernia. Given our findings, we hypothesize that tension created by the hernia pulling on the skin, as demonstrated by scrotal sac dilation combined with subsequent/concurrent lymphedema, likely contributed to what appeared to be a buried penis. However, the lack of accessible information on this cadaver, including a detailed past medical and surgical history, limits the certainty of a buried penis diagnosis in this context.

This case is unique in exploring the possible relationship between a giant inguinoscrotal hernia and a buried penis but without the detailed patient history typically required for a definitive buried penis diagnosis. Our findings highlight the limitations of diagnosing a buried penis in donor studies and suggest that anatomical changes other than the previously well-defined historical criteria should be considered as likely contributors to adult-acquired buried penis.

Key Words: *Hidden penis; Hidden penis syndrome; Buried penis; Buried penis syndrome; Giant indirect inguinoscrotal hernia*

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Introduction

Buried or hidden penis, also known as buried or hidden penis syndrome, is a condition where the penis is normal in size, but concealed beneath the abdomen, thigh, or scrotum [1]. Classically, buried penis affects children due to congenital abnormalities, scarring post-circumcision, or obesity [2,3]. Buried penis in adults is not well-defined, but is primarily acquired secondary to obesity/large suprapubic fat pad, penoscrotal lymphedema, or history of penile surgery, abdominoplasty, or penile injections [4,5]. Inflammatory conditions such as diabetes, lichen sclerosus, and hidradenitis suppurativa have also been associated with development of a buried penis [4]. Buried penis syndrome can lead to medical complications, such as urinary tract infections, surrounding skin infections, and even penile cancer, though quality of life disturbances, such as urinary and sexual dysfunction, impaired social life, and mental health issues are often what drive patients to seek care [6,7]. Diagnosis is a clinical one that relies heavily on a detailed patient history and thorough physical examination to identify conditions known to cause buried penis.

While buried penis syndrome is a relatively rare occurrence, abdominal wall hernias are not. There are many types of abdominal wall hernias, but the majority (75%) are inguinal hernias. It is estimated that approximately 25% of men will develop an inguinal hernia over their lifetime, more likely indirect (66.7%) versus direct (33.3%), leading to roughly 800,000 surgical repairs performed each year [8]. Giant indirect inguinoscrotal hernias are much less common, with one report finding that only 1.1% of indirect inguinal hernias are greater than 10 cm [9].

Previous case reports have documented giant indirect inguinoscrotal hernias coinciding with a penis that is buried in the scrotal sac, however, these reports focus primarily on the hernia, with limited discussion regarding the buried penis [10,11]. Scrotal lymphedema is recognized in the urologic literature as a known cause of buried penis, and giant indirect inguinoscrotal hernias are known to cause scrotal lymphedema. This report of an 86-year-old male donor with a giant indirect inguinoscrotal hernia and concurrent buried penis provides a potentially underrecognized cause of buried penis and challenges the need for a comprehensive patient history and physical examination for diagnosis, which is not possible in the donor anatomical dissection setting.

Case Presentation

Upon receipt of our formalin-fixed donor, an 86-year-old Indian male whose cause of death was listed as cardiovascular disease, a penis was not externally visible. Routine dissection of the femoral triangle was interrupted due to an enlarged scrotal sac (approximately 14 cm in length and 10 cm in width) covering the area, which prompted a closer investigation of the genital area (Figures 1a and b). Further dissection revealed a normal-sized penis (approximately 8 cm long and 3.5 cm wide, measured from the suspensory ligament of the penis) embedded within the dilated scrotal sac (Figures 2a and b). Additional findings within the scrotal sac included a right testicle that was larger than the left, fluid within the sac and within the visceral and parietal layers of the tunica vaginalis, and a right-sided indirect inguinoscrotal hernia that involved most of the ileum was found inside the right scrotal sac (Figures 3a and b). A hematoma on the lower fold (lateral border) of the scrotal sac was also seen which correlated with external markings on the scrotum, leading us to believe that the herniated ileum compressed the testicular vessels causing the hematoma, fluid accumulation, and the scrotal abrasion (Figure 4). Inspection of the abdomen revealed no obvious surgical scars. Originally, we were suspicious of prior prostate cancer

treatment as a possible cause for the donor's buried penis, but infrapubic dissection revealed cysts on the right anterior aspect of the prostate without firmness or nodularity. The bladder was non-distended without trabeculations, making these findings most consistent with mild benign prostatic hyperplasia (BPH) given the patient's age and the fact that histological samples taken from both the right and left anterior prostate were benign. Additionally, further dissection of the rectovesical pouch showed no evidence of penetration from prostatic cancer treatment, and nothing of note was found with further dissection into the retropubic space.

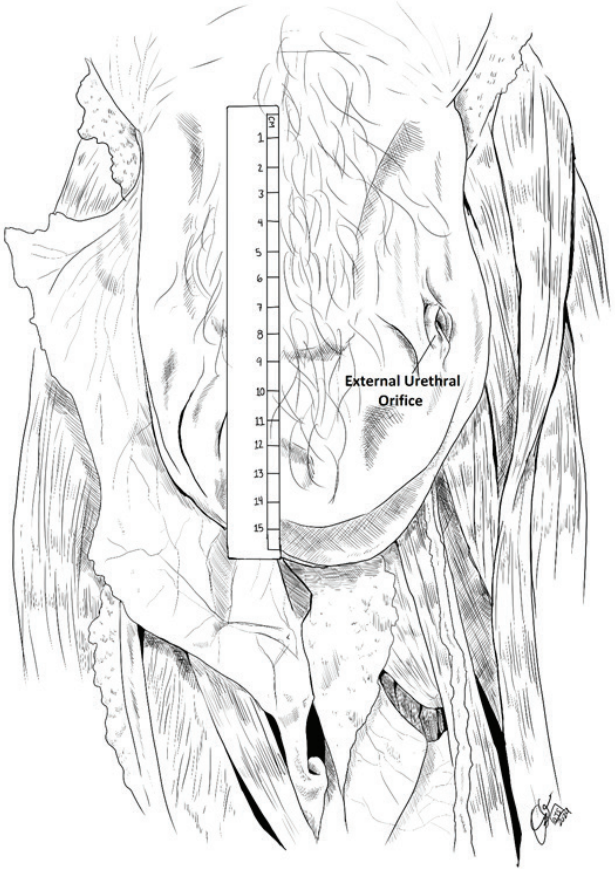

Figure 1A) *Schematic of the donor's lower abdominal region including a ruler measuring the size of the distended scrotal sac and highlighting the location of the external urethral orifice.*

Figure 1B) *Image used to create the schematic for Figure 1a.*

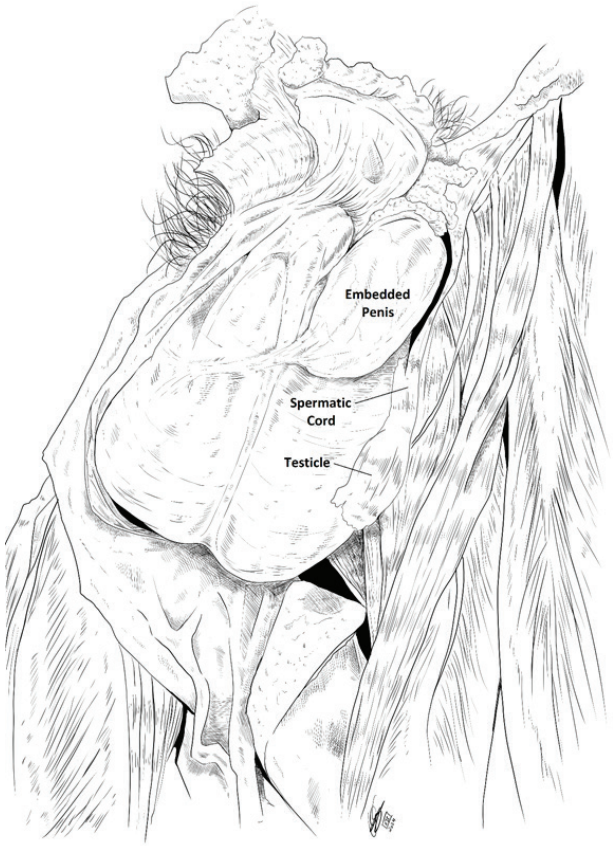

Figure 2A) *Schematic of the donor's incised scrotal sac showing the location of the embedded penis, as well as the left spermatic cord and left testicle.*

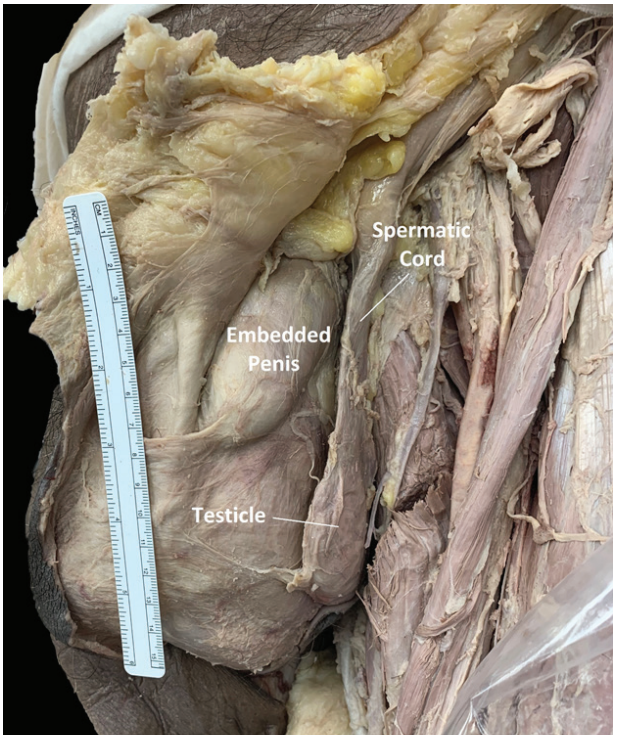

Figure 2B) *Image used to create the schematic for Figure 2a with a ruler included for measurements.*

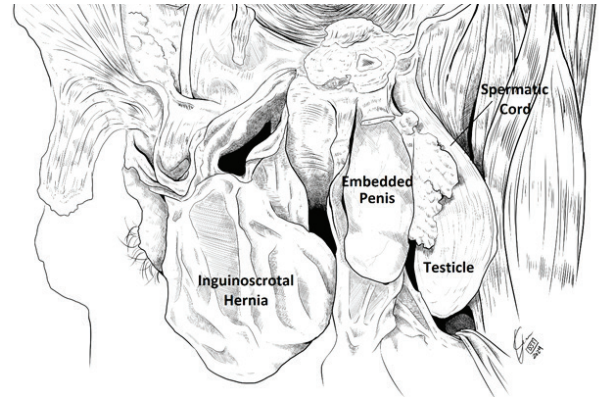

Figure 3A) *Schematic of the donor's lower abdominal region with the scrotal sac reflected distally and laterally to show the location and size of the right inguinoscrotal hernia, as well as the embedded penis, left spermatic cord, and left testicle.*

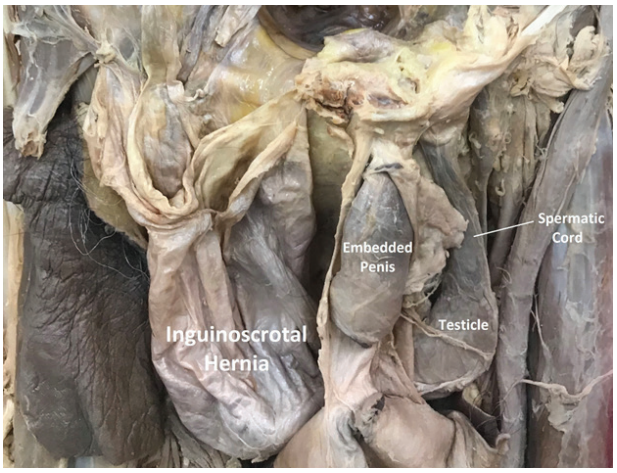

Figure 3B) *Image used to create the schematic for Figure 3a.*

Figure 4) *Image highlighting the hematoma located on the lower told (lateral border) of the scrotal sac.*

Discussion

This report highlights a case of an 86-year-old male donor with a giant indirect inguinoscrotal hernia associated with a penis that was not externally visible, but, on further dissection, was found to be normal in length at approximately 8 cm. According to a 2023 systematic review and meta-analysis, the "normal" penile length was found to be 8.70 cm (95% CI, 8.16–9.23) for a flaccid penis [12]. This point is critical, as it differentiates a buried penis from a congenital micropenis, penile agenesis, or other congenital or pathological reductions in penile size [13]. The proper identification and diagnosis of a buried penis is important, as there are numerous available treatment options [1,2]. Despite the normal penile length of this donor, the inability to gather a detailed medical and surgical history from the donor technically limits our ability to diagnose a buried penis. However, our findings suggest not only that a giant indirect inguinoscrotal hernia can cause lymphedema which leads to a buried penis, but also that the diagnosis of the buried penis in a donor subject

may not require a comprehensive patient history and physical examination.

Limitations of diagnosing buried penis in donor studies

Diagnosing buried penis is limited in donor studies for a multitude of reasons. This is primarily because the diagnosis is clinical and typically requires a detailed patient history, which is essential for elucidating underlying causes of the buried penis such as past medical history (diabetes, lichen sclerosus, hidradenitis suppurativa), surgical history (radical circumcision, penile enlargement, abdominoplasty, lymph node dissection, hernia repair, etc.), and body mass index. The physical exam is also limited in donor studies as tissue changes (skin contraction, tissue dehydration) due to post-mortem preservation can obscure the true condition of the tissues. Additionally, donor studies are restricted to anatomical inference, which may not fully explain the underlying etiologies of concealed penis in living patients. However, cases such as the one we described above suggest that the diagnosis of buried penis may not need to be restricted to the clinic.

Connecting giant indirect inguinoscrotal hernia and buried penis

While buried penis and inguinoscrotal hernias are distinct conditions, we were able to find a significant number of case reports in which giant indirect inguinoscrotal hernias co-existed with a penis that was buried in the scrotal sac [10,11,14-18]. These case reports focus primarily on the surgical management of the giant indirect inguinoscrotal hernia with only brief mention of the buried penis as a complication leading to quality-of-life disturbances as well as ulceration and secondary infection. Other reports of adult-acquired buried penis focus on obesity or scrotal lymphedema as causes, without mention of indirect inguinal hernias. However, the presence of both conditions in our donor and the aforementioned case reports warrants further exploration of the interrelationship between the two. Specifically, it suggests a stepwise progression from indirect inguinoscrotal hernia to acquired hidden penis syndrome.

Here we propose one potential mechanism for such progression based on the findings of dissection of our donor: first, the development of an indirect inguinoscrotal hernia occurred, whether it was congenital or acquired is hard to determine. Regardless of origin, the donor likely neglected to address the hernia, potentially due to lack of resources and/or embarrassment leading to continued growth of the hernia over time. As the patient's ileum descended into the right scrotal sac, the tension created by the weight of the ileum pulled on the skin leading to scrotal sac dilation. Additionally, compression of the testicular vessels by the contents of the hernia resulted in both hematoma formation on the lateral border of the scrotal sac as well as lymphedema, evinced by our findings of fluid within the scrotal sac and within the visceral and parietal layers of the tunica vaginalis. The combination of scrotal sac dilation and lymphedema likely led to the retraction of the penis into the scrotal sac.

Implications for future understanding and diagnosis of buried penis

This case report suggests that expanded diagnostic criteria for buried penis may be warranted, particularly in the setting of buried penis acquired secondary to non-traditional causes and/or in the setting of donor studies. It also highlights the need for clinicians to evaluate for the presence of non-traditional conditions, such as an indirect inguinal hernia, in addition to other well-described causes, in their workup of acquired buried penis.

Conclusion

This case report discusses a unique instance of an 86-year-old male donor whose penis was not externally visible secondary to scrotal lymphedema combined with a giant indirect inguinoscrotal hernia. This case highlights a

potentially underrecognized cause of adult-acquired buried penis and suggests a need for expansion of the current diagnostic criteria for buried penis. Finally, this case report underscores the difficulties of obtaining predominately clinical diagnoses in donor studies, where detailed patient history and physical exam are severely limited.

Disclaimer

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