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Unveiling the Rare Dual Challenge: Adult Inguinal Hernia with Undescended Testis - A Case Series, Surgical Triumphs, and In- Depth Literature Review

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Abstract: ***Background: Inguinal hernias are among the most common surgical conditions worldwide, with lifetime risk varying depending on the demographics, occupation, and comorbidities. Cryptorchidism, or undescended testis, is typically diagnosed in pediatric populations but can rarely persist into adulthood, occasionally presenting alongside inguinal hernias. The objective is to discuss the clinical presentation, surgical management, and outcomes of adult patients with inguinal hernias associated with ipsilateral undescended testis. In this series, three adult cases of inguinal hernia with concurrent undescended testis were analyzed. All patients underwent definitive surgical intervention, which included orchidectomy and mesh hernioplasty. Results: The report details the diagnostic challenges and surgical strategies employed in each case, as well as the postoperative outcomes. The key considerations included the risk of malignant transformation in the undescended gonad, the choice between orchiopexy and orchidectomy, mesh - related complications, and the role of comorbidities on perioperative risks. Conclusion: These cases highlight the importance of a multidisciplinary approach and meticulous surgical planning in managing adults with inguinal hernias and concurrent cryptorchidism. The findings underscore the need for awareness of the potential complications and the necessity for tailored surgical strategies to ensure favorable outcomes.***

Keywords: Adult Presentation; Cryptorchidism; Hernioplasty; Inguinal hernia; Orchidectomy; Undescended testis

1. Introduction

Inguinal hernias account for a significant proportion of abdominal wall hernias and continue to be one of the most frequent procedures performed by general surgeons globally with lifetime risk of 27% in men and 3 - 5% in women (1, 2). While inguinal hernia repairs are common, they may coexist rarely congenital or developmental anomalies in select patients resulting in complications.

Cryptorchidism, is one such anomaly primarily diagnosed in paediatric populations. By definition, cryptorchidism refers to a testis that is not located in the scrotum and is arrested at any point along the normal path of descent (3). It affects 1–4% of full - term male infants at birth. Most cases of cryptorchid testis descend spontaneously during the first few months of life; however, about 1% of boys older than six months continue to harbour an undescended testis (4). Persistent cryptorchidism in adult life is relatively rare in high - income countries due to early paediatric screening and surgical intervention, but it remains a possibility in regions with limited healthcare access, lower awareness, or cultural barriers (5).

The co - occurrence of an inguinal hernia with an undescended testis in adults has important clinical implications (6). Firstly, cryptorchidism is associated with a higher risk of testicular malignancy, particularly seminoma. The risk of malignancy in an undescended testis is believed to be up to four to five times higher than in a normally descended gonad (7). Secondly, a cryptorchid testis in the inguinal canal may alter the typical presentation of an inguinal hernia, potentially obscuring or delaying diagnosis. Thirdly, the management strategy must be tailored not only toward reducing the hernia and repairing the defect but also addressing the testicular position and viability (8). For adult patients, an orchidectomy is sometimes recommended rather than orchiopexy, particularly if the testis is atrophic, functionally compromised, or if the patient is beyond a certain age threshold, given the theoretical long - term risk of malignancy and questionable fertility benefits (9). The decision between orchidectomy versus orchiopexy depends on multiple factors, including the patient's age, the status of contralateral testis, fertility desire, testicular viability, and the presence or absence of malignant changes (10).

Most published guidelines and evidence - based reviews on cryptorchidism focus on the paediatric population, emphasizing orchiopexy before or around one year of age (11, 12). There is a paucity of data addressing the co - occurrence of cryptorchidism and inguinal hernia in adult patients. Hence, adult patients presenting with an undescended testis—especially discovered incidentally during an inguinal hernia evaluation—require individualized management. The risk–benefit analysis for orchiopexy in an adult (to preserve endocrine or fertility function) must be balanced against the

risk of seminoma or other germ cell tumors developing in cryptorchid testicular tissue (9, 13). Furthermore, certain comorbidities in adult patients—such as type 2 diabetes mellitus or hypertension—may complicate and prolong the perioperative course (14).

The following case series outlines three male patients who presented in adulthood with painful inguinal swellings initially suspected to be inguinal hernias. However, clinical examination and further imaging along with intraoperative findings revealed that each patient also harboured an undescended testis in the respective inguinal canal. We delineate the workup, management strategies, and immediate outcomes of each patient, followed by an extensive discussion of the literature and considerations for surgical decision - making. Through these cases, this report aims to contribute to the limited but growing body of knowledge addressing the rare adult presentation of cryptorchidism with concurrent inguinal hernia.

2. Case Presentations

2.1 Case 1

Patient Profile and History
A 42 - year - old male (hereafter "Patient 1") diabetic, presented with a primary complaint of swelling in the left groin region for 25 days with mild pain in the same area, describing it as a dull, aching sensation aggravated by prolonged walking or straining. He denied any history of trauma or other constitutional symptoms. No other significant past surgical or medical histories were reported. His occupational history involved moderate physical labour.

Clinical Examination
Local examination revealed two discrete swellings in the left groin region. The first ovoid swelling measuring about 2 × 3 cm noted just above the inguinal ligament, soft in consistency, reducible with positive cough impulse. Another swelling of 3 x 2 cm noted in the left inguinal region, 3 cm from the Anterior Superior Iliac Spine, non - tender, firm consistency, non - reducible, no cough impulse. Deep ring occlusion tests were negative for both swellings. On scrotal examination, the left scrotum was empty, with loss of rugosities. The right hemiscrotum was normal.

Investigations
Ultrasonography (USG) of the abdomen and scrotum, complemented by a Colour Doppler, revealed an echogenic mass consistent with testicular tissue – with markedly decreased vascularity in the left inguinal region. The left hemiscrotum lacked a normal testis. The imaging also indicated a left inguinal hernia sac containing bowel loops intermittently, consistent with clinical examination.

Diagnosis and Management Plan
The diagnosis was a **left inguinal hernia with undescended left testis**. The decision of an orchidectomy was influenced by the patient's fatherhood status (he had completed his family and gave consent for orchidectomy) and the testis being significantly atrophic on imaging.

Operative Procedure
A left orchidectomy with Lichtenstein tension free inguinal hernioplasty was planned. Intraoperatively, the left undescended testis was then carefully isolated and resected (orchidectomy) due to atrophy and potential increased risk of malignant transformation (Figure 1). The specimen was sent for histopathological evaluation.

Figure 1

Postoperative Course
Postoperatively, the incision site healed well.

2.2 Case 2

Patient Profile and History
A 32 - year - old, hypertensive male ("Patient 2") presented with a 15 - day history of swelling in the right groin region with mild discomfort and pain in the area, occasionally exacerbated by walking or lifting heavy objects. The swelling was initially 1 × 1 cm but progressed to 2 × 3 cm over two weeks. There was no reported fever, burning micturition, or trauma. The patient had a habit of heavy weight lifting in his occupation. He denied any prior surgeries.

Clinical Examination
Local inspection of the groin revealed a palpable ovoid swelling in the right inguinal region, measuring 2 × 3 cm, 2 cm from the pubic tubercle, with positive cough impulse - suggestive of a hernia. The right scrotal sac was undeveloped and appeared empty; no testis was palpable in the right hemiscrotum. The left hemiscrotum and testis were unremarkable.

Investigations
An imaging study comprising ultrasound of the abdomen, scrotum, and inguinal canal demonstrated absence of the right testis in the scrotum with an ovoid structure suggestive of testicular tissue (significantly atrophic) near the superficial inguinal ring. A right indirect inguinal hernia sac was also visualized. The left testis was normal.

Diagnosis and Management Plan
The diagnosis was **right inguinal hernia with right undescended testis** in a 32 - year - old with hypertension. The surgical team weighed the option of orchidectomy due to significant atrophic right undescended testis.

Operative Procedure
A Right open inguinal Lichtenstein Tension Free hernioplasty was performed. The undescended testis was discovered within the inguinal canal, partially mobile but with a short spermatic cord. The testis appeared small in volume and atrophic, and an orchidectomy performed (Figure 2). The specimen sent for histopathological examination.

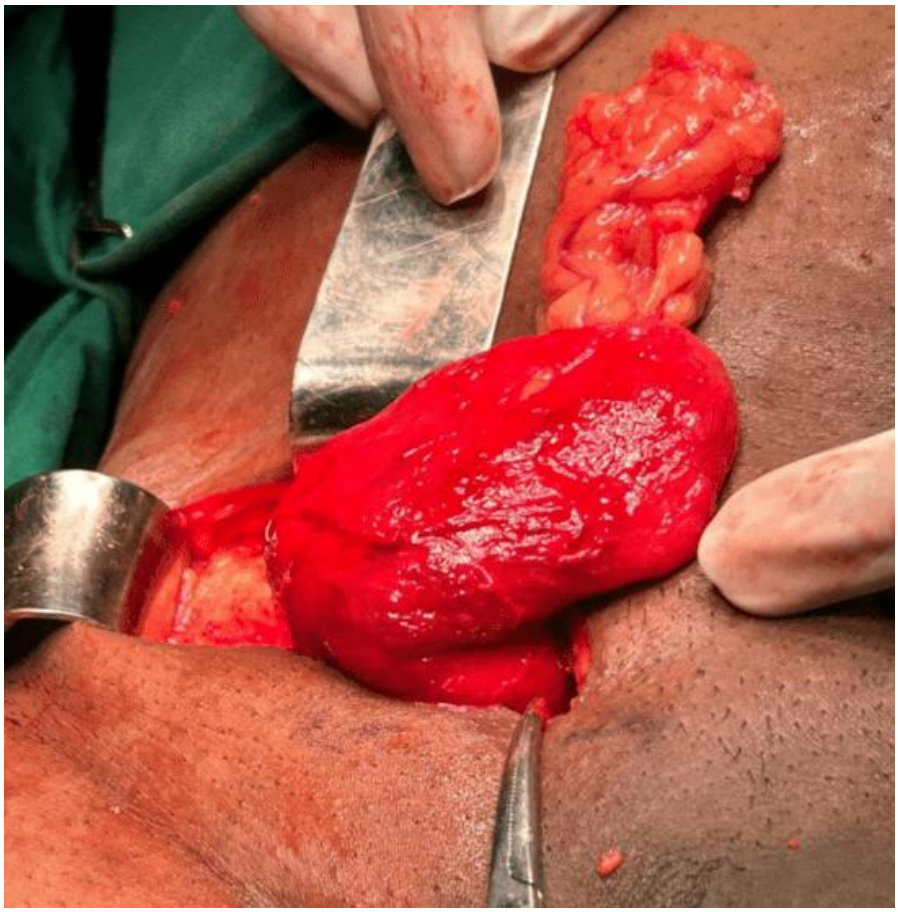

Figure 2

Postoperative Course
The patient's postoperative recovery was uneventful.

2.3 Case 3

Patient Profile and History
A 43 - year - old male, known diabetic and hypertensive ("Patient 3") presented with a 7 - day history of pain in the left groin region, exacerbated by walking or lifting heavy objects. There was no complaint of swelling, fever, burning micturition, trauma or previous surgeries.

Clinical Examination
Local inspection of the groin revealed an ovoid swelling of 3 x 2 cm in the left inguinal region, 5 cm from the pubic tubercle, firm in consistency, nonreducible, with absent cough impulse. The left hemiscrotal sac was undeveloped and empty. The right hemiscrotum and testis were normal.

Investigations
An imaging study comprising ultrasound of the abdomen, scrotum, and inguinal canal with a colour doppler demonstrated absence of the left testis in the scrotum with an ovoid structure suggestive of testicular tissue near the deep inguinal ring, which was small and atrophic. A left indirect inguinal hernia sac was also visualized. The right testis was normal.

Diagnosis and Management Plan
The working diagnosis was **left inguinal hernia with left undescended testis** in a 43 - year - old with type 2 diabetes mellitus and hypertension. Given the patient's age, absence of testicular viability, and the documented risk of malignancy in cryptorchid testis, the surgical team planned for an orchidectomy. The decision was influenced by the patient's fatherhood status (he had completed his family and gave consent for orchidectomy) and the testis being small and atrophic on imaging.

Operative Procedure
A left orchidectomy with Lichtenstein tension - free hernioplasty was planned. The left undescended testis was carefully isolated and resected (orchidectomy) due to atrophy and potential increased risk of malignant transformation. The specimen was sent for histopathological evaluation.

Postoperative Course
The incision site healed well with no other complications (Figure 3).

Figure 3

3. Discussion

Adult presentation of a cryptorchid testis concurrent with an inguinal hernia is an infrequent but clinically significant phenomenon. While inguinal hernias rank among the most commonly encountered surgical pathologies globally, the incidental discovery of an undescended testis at the time of hernia evaluation remains relatively rare (1). Most undescended testes are identified and surgically corrected during childhood, thereby diminishing their likelihood of persisting into adult life. However, in areas with fewer healthcare resources or delayed medical consultation, cryptorchidism may go unrecognized until adulthood. When an adult patient presents with palpable groin swelling and a contralateral or ipsilateral empty hemiscrotum—it requires a high index of suspicion and careful diagnostic workup.

Ultrasound remains a first - line modality for localizing the undescended testis and evaluating vascularity, while also helping to characterize the concurrent hernia sac (2, 3). Magnetic resonance imaging can be employed for complicated cases, especially when ultrasound findings are equivocal or when malignancy is suspected, but in resource - limited settings, ultrasound often proves sufficient (4).

A key dilemma in these adult patients concerns the decision between orchidectomy and orchiopexy. Historically, orchidectomy was recommended for older patients, given the increased malignancy risk in the cryptorchid gonad and the limited fertility benefits of a testis that has remained undescended for decades (5). However, younger adults, especially those with a desire to preserve fertility, may benefit from orchiopexy if the testis appears viable and well - vascularized (2). In the present series, all of the patients underwent orchiectomy because the testis were atrophic and the individuals had completed their family.

Malignancy risk must always be considered. Cryptorchidism is known to increase the potential for testicular germ cell tumors, particularly seminoma (7). Early orchiopexy, ideally performed in childhood, may lower this risk, though it does not eliminate it. Where orchidectomy is chosen, histopathological evaluation of the specimen is mandatory to rule out occult cancer (7). Fortunately, in all the cases, the pathology report did not reveal malignant changes, despite long - standing cryptorchidism.

If an orchiopexy is planned, the surgeon may have to create a new sub - dartos pouch in the scrotum and ensure sufficient vascular pedicle length for a tension - free mobilization. Where the testis is removed, attention is directed toward ensuring adequate hemostasis and thorough evaluation of the cord to exclude additional pathology (9).

Comorbidities like diabetes mellitus and hypertension add layers of complexity to surgical and anaesthetic management (10, 11).

Long - term surveillance after cryptorchidism management in adulthood is also crucial. For men who undergo orchiopexy, routine self - exams and periodic ultrasounds can help detect early malignant changes or progressive atrophy (7). Additionally, assessing fertility may be relevant if the patient

desires children in the future, although the fertility potential of a late - positioned testis is often limited compared to one corrected in childhood. Nevertheless, orchiopexy may still preserve some degree of spermatogenesis or at least ensure a normally positioned testis for endocrine function and psychological benefit (6).

Overall, these three cases highlight the intricate balance of anatomical, oncological, fertility - related, and quality - of - life considerations that arise when cryptorchidism is diagnosed in adult males undergoing inguinal hernia repairs. Although such presentations are unusual, clinicians should remain vigilant for this co - occurrence, particularly in patients with an empty hemiscrotum or a history of unrecognized groin swellings. Early recognition, appropriate imaging, and individualized surgical planning remain key to optimal outcomes. Looking forward, larger studies that capture a broader range of adult cryptorchidism cases could yield valuable insights into the most effective strategies for operative management, follow - up, and postoperative counseling, while further investigating minimally invasive options such as laparoscopic or robotic - assisted orchiopexy or orchidectomy (12).

4. Conclusion

Adult presentation of cryptorchidism in combination with inguinal hernia remains a rare phenomenon in regions with robust paediatric healthcare services, yet these cases underscore the importance of thorough physical examination, astute imaging, and patient - centered decision - making for definitive treatment. The choice between orchiopexy and orchidectomy often hinges on patient age, fertility desires, the size and vascular status of the undescended testis, and comorbid conditions. A multidisciplinary team—including endocrinologists, fertility experts, and surgeons—can optimize outcomes, particularly in those with significant metabolic or cardiovascular comorbidities.

The key message derived from these cases is that adult cryptorchidism necessitates individualized treatment pathways. Routine paediatric screening and timely correction remain the best prevention strategies. When encountered in adulthood, careful preoperative planning, appropriate counseling regarding fertility and malignancy risks, and vigilance in follow - up are paramount to delivering high - quality patient care.

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