CASE REPORT
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Lower Extremity Complications After Urethroplasty in Extended Lithotomy: A Case Series and Review

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Abstract

Urethroplasty, often performed in the extended lithotomy position, may lead to rare but serious lower extremity complications due to prolonged positioning. This case series describes three patients with complications post-urethroplasty and reviews risk factors and preventive strategies. Between 2023 and 2024, 76 urethroplasties were performed at our center. All patients were in the age group of 18-70 years. We report three cases of lower extremity complications -well leg compartment syndrome (WLCS), deep venous thrombosis (DVT), and femoral neuropathy- in patients undergoing urethroplasty in extended lithotomy. Case 1 (23-year-old male) developed WLCS post-stage 1 urethroplasty, managed with four-compartment fasciotomy and skin grafting, with full recovery. Case 2 [55-year-old male, body mass index (BMI) 26, prior pelvic fracture] experienced femoral neuropathy after progressive perineal urethroplasty. The condition was treated with dexamethasone, and he recovered fully within one month. Case 3 (68-year-old male, prior pelvic fracture) developed DVT, post-progressive perineal urethroplasty, which was resolved with heparin and warfarin. Risk factors included prolonged surgery (4-4.5 hours), extended lithotomy, high BMI, and prior pelvic trauma. Lower extremity complications post-urethroplasty are rare but debilitating. Preventive measures, including optimized limb support, intermittent decompression, and surgical efficiency, are critical, especially in high-risk patients (e.g., those with pelvic trauma or obesity).

Keywords: Urethroplasty, well leg compartment syndrome, deep venous thrombosis, femoral neuropathy, lithotomy position

Introduction

Urethral strictures, resulting from trauma, infection, or idiopathic causes, often require urethroplasty performed in the extended lithotomy position to access the perineum (1). Prolonged positioning may lead to lower extremity complications, including well leg compartment syndrome (WLCS), deep venous thrombosis (DVT), and sensory or motor neuropathy (2,3). WLCS, a rare complication (incidence 1:3,500), arises from increased intracompartmental pressure due to ischemia from prolonged lithotomy positioning (2,3). DVT and neuropathy are also associated with extended surgery, high body mass index (BMI), and prior pelvic trauma (4,5). This case series describes three patients who developed lower extremity complications post-urethroplasty at our center during 2023-2024, highlighting risk factors, management, and preventive strategies.

Materials and Methods

Between 2023 and 2024, 76 urethroplasties were performed at our tertiary care center in India. All patients were in age group of 18-70 years. We identified three patients who developed lower extremity complications post-urethroplasty in the extended lithotomy position. Data were collected on patient demographics, surgical details, complications, management, and outcomes. All procedures were performed under spinal or general anesthesia, with legs elevated in metal stirrups and wrapped with foam padding. All patients were evaluated preoperatively for bleeding disorders, and a coagulation profile was performed, which was normal. Thrombo-embolus deterrent (TED) Stockings were used routinely in all our urethroplasty patients perioperatively as thromboprophylaxis. We routinely follow a protocol of mobilization of all urethroplasty patients from post-operative day 1. Ethical approval was obtained from the Institutional Ethics Committee.

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Case Presentations

Case 1

A 23-year-old male with urinary retention, underwent stage 1 urethroplasty for a long-segment bulbar urethral stricture, confirmed by retrograde urethrography. His preoperative routine investigations were within normal limits and his BMI was 21.8. The procedure, performed under spinal anesthesia in extended lithotomy, lasted 4 hours. On postoperative day 1, he developed severe left lower limb pain and swelling, with calf tenderness and pain on passive dorsiflexion. Distal pulses and sensations were intact. Doppler ultrasound revealed subcutaneous edema. By day 2, worsening symptoms confirmed WLCS, which was treated with four-compartment fasciotomy. Skin grafting was performed later, and the patient recovered fully.

Case 2

A 55-year-old male (BMI-26) with a history of pelvic fracture and two failed end-to-end urethroplasties underwent progressive perineal urethroplasty under general anesthesia (4.5 hours, extended lithotomy). All his routine investigations, including bleeding parameters, were within normal limits. He did not have any significant medical history. On postoperative day 2, he reported bilateral lower limb weakness (power grade 2 in knee extensors and hip flexors) with absent knee jerks but intact sensations. Magnetic resonance imaging confirmed femoral neuropathy, likely due to inguinal ligament stretching. Dexamethasone (8 mg twice daily, tapered over 1 month) led to full motor recovery within 1 month.

Case 3

A 68-year-old male (BMI-23) with a history of pelvic fracture and prior end-to-end urethroplasty presented with acute urinary retention. Retrograde urethrography showed proximal bulbar urethral cut-off. His cardiac workup was normal, and his bleeding parameters and routine investigations were within normal limits. The patient did not have any history of varicose veins. Progressive perineal urethroplasty was performed under general anesthesia (4 hours, extended lithotomy). On postoperative day 1, right lower limb swelling and calf tenderness developed, with pain on passive dorsiflexion. A Doppler test confirmed the presence of DVT, which was managed with heparin followed by warfarin (5 mg daily). Swelling resolved by day 5, and follow-up Doppler at 1 month showed no thrombosis (Table 1, Figures 1-3).

The written informed consent was obtained from the patient.

Discussion

The extended lithotomy position, involving hip flexion and leg elevation in stirrups, facilitates perineal access during urethroplasty but poses risks for lower extremity complications (2,3). WLCS, an entity that develops in an otherwise normal lower limb, results from increased intracompartmental pressure due to hypoperfusion during prolonged positioning, exacerbated by intraoperative hypotension to reduce bleeding (4,6). Case: Lengthy surgical duration (4-4.5 hours) and improper leg support (e.g., calf vs. heel support) increase the risk (7). Preventive measures should include the use of Allen stirrups, intermittent limb decompression, and minimizing flexion at the groin and knee (7,8). Adequate padding of lower limbs is of utmost importance for the prevention of such complications.

DVT, though rare in benign urological procedures, is associated with high BMI and prior pelvic trauma, as seen in Case 3 (9,10). Pelvic fractures may predispose individuals to venous stasis, increasing the risk of (5). Two of our patients described above had pelvic fractures and developed lower limb complications, indicating pelvic fracture as a risk factor as well. Preoperative lower extremity assessment and perioperative anticoagulation in high-risk patients are recommended (9). All our patients were assessed preoperatively by routine blood investigations, bleeding parameters, and cardiac workup. Our patients, described above, had all these parameters within normal limits. In a study by Dyer et al. (11), the incidence of symptomatic venous thromboembolism in those patients not receiving thromboprophylaxis was as high as 10% for DVT and 9% for PE pulmonary embolism following both transvesical and transurethral resection of prostate. TED stockings were used in all our patients as thromboprophylaxis. However, medical thromboprophylaxis was not used in our patients.

Table 1. Summary of cases

Case	Age	Surgery	Duration	Complication	Management	Outcome
1	23	Stage 1 urethroplasty	4 h	WLCS	Four-compartment fasciotomy, skin grafting	Full recovery
2	55	Progressive perineal urethroplasty	4.5 h	Femoral neuropathy	Dexamethasone 8 mg BD, tapered 1 month	Full motor recovery in 1 month
3	68	Progressive perineal urethroplasty	4 h	DVT	Heparin, warfarin 5 mg for 1 month	No thrombosis at 1-month follow-up

WLCS: Well leg compartment syndrome, DVT: Deep venous thrombosis

Figure 1. Incision for compartment release

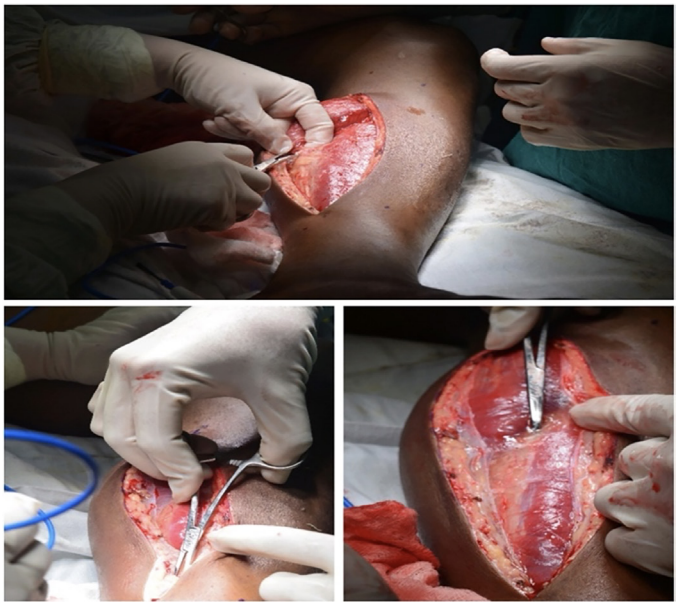

Figure 2. Four compartment release

Figure 3. Extended lithotomy position used in our patients

Femoral neuropathy, as in Case 2, results from inguinal ligament stretching or nerve compression in lithotomy, causing motor deficits (12). Most cases are neurapraxia (Seddon Class 1), with full recovery, as observed in studies (13). Sensory neuropathy, reported in 14% of urethroplasty patients, may involve pudendal nerve branches due to bulbospongiosus muscle manipulation (10,12). Undue pressure on lower extremities during surgery may lead to the development of such neuropathies and hence, should be avoided.

WLCS following urethroplasty was first demonstrated by Leff and Shapiro (2) in 1979, when a patient developed compartment syndrome after a urethroplasty lasting 6.5 hours. They had suggested the use of leg suspension for such procedures. However, leg suspension can, as suggested by a case in the same article, lead to peroneal nerve palsy. In a similar case by Moses et al. (14), WLCS, even after adequate padding, resulted as was the case in our patients. Warner et al. (15) have studied lower extremity neuropathies widely. In their study, although most patients underwent gynaecological surgeries in lithotomy position, a few also underwent prostate surgeries and developed neuropathy involving the lateral femoral cutaneous nerve. All those patients were positioned in the lithotomy position using a knee crutch leg holder as used in our patients. A study by Reddy et al. (16) showed that use of Krauss arm supports as stirrups, along with pneumatic devices, reduces postoperative morbidity in patients undergoing procedures in the lithotomy position.

All the articles discussed above have mentioned hypovolaemia, increased BMI, diabetes, and undue external compression as risk factors for the development of complications in the lower extremities. In addition to this, two of our patients described above had a history of pelvic fracture, which could be an independent risk factor, although we could not find any significant evidence in the literature.

Preventive strategies include:

- Optimized Positioning: Use Allen stirrups with heel support, adequate padding, and minimal hip/knee flexion (7).
- Surgical Efficiency: Limit surgery to <4 hours when possible (3).
- Risk Stratification: Screen for obesity, diabetes, or pelvic trauma history (5).
- Intraoperative Monitoring: Employ intermittent limb decompression and monitor perfusion (8).

Conclusion

Lower extremity complications post-urethroplasty, though rare, can be debilitating. Risk factors include prolonged surgery, extended lithotomy, high BMI, and prior pelvic trauma. Preventive

measures -optimized limb support, surgical efficiency, and risk stratification- are essential. Patients with pelvic fracture history require careful preoperative counseling and monitoring. This case series underscores the need for awareness and proactive management to mitigate these complications.

Ethics

Informed Consent: The written informed consent was obtained from the patient.

Footnotes

Authorship Contributions

Surgical and Medical Practices: V.P., M.H.S.A., P.P., A.S., Concept: P.P., Design: A.S., Data Collection or Processing: V.P., Analysis or Interpretation: M.H.S.A., Literature Search: V.P., Writing: V.P.

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