**Non- Ischemic Priapism as a Rare Sequela of Trauma and its Management: A Case Report**

.

ABSTRACT

**Introduction**

Priapism is the state of persistent and painful erection of the penis, with a duration more than 4 hours, which is unrelated to sexual stimulation.

**Case**

A 45 year old man came with painless penile erection which gradually progressed and became persistent since the last 4 days. He gave a history of fall due to slipping while running, leading to blunt perineal trauma 8 days back. CT Angiography revealed contrast extravasation involving the right corpora cavernosa in the arterial phase. A fistulous communication was noted between the right dorsal artery of penis and the cavernosal sinusoids. A decision for angioembolisation was taken in view of the high success rates and minimally invasive approach.

**Conclusion**

With the advent of minimally invasive therapy, angioembolisation is the most feasible option with the maximum benefit to preserve potency.

*Keywords: angioembolisation, arterial-sinusoidal fistula, high-flow, perineal trauma*

1. INTRODUCTION

Priapism is the state of persistent and painful erection of the penis, with a duration more than 4 hours, which is unrelated to sexual stimulation. The reported incidence is 0.3 - 1 per 100,000 men each year, with 40 – 50 years being the most common age group affected [1]. It is mainly of three types – ischemic (low-flow), non-ischemic (high-flow), and stuttering (intermittent) priapism. Though the etiology differs for each, the most common cause is idiopathic [2]. These cases, especially ischemic ones, need emergent intervention to reduce progression to complete and permanent erectile dysfunction with the main aim being to achieve detumescence [3].

Non-ischaemic priapism is significantly less common and comprises upto 5% of the cases, with blunt penile or perineal trauma being the culprit [4]. There is often a delay of upto 2-3 weeks between the trauma and the development of the priapism [5]. The other documented causes include post spinal cord injury, iatrogenic causes like following internal urethrotomy, circumcision, Nesbit procedure, transrectal prostate biopsy or even post brachytherapy for prostate cancer. It can also occur post shunt creations for ischemic priapism [6].

Blood aspiration from the corpora cavernosa shows bright red arterial blood in non-ischemic priapism, while it is dark in ischaemic priapism. Thus, blood gas analysis is a reliable tool to differentiate between the two types [4]. This differentiation is necessary as it helps to guide the further treatment and prevent complications like erectile dysfunction which may arise due to penile fibrosis occurring as a result of delayed or inappropriate management.

**2. CASE PRESENTATION**

A 45 year old man came with painless penile erection which gradually progressed and became persistent since the last 4 days. He gave a history of fall due to slipping while running, leading to blunt perineal trauma 8 days back. There were no other associated injuries. There was no history of hematuria or any other urinary complaints post trauma. Medical history was unremarkable. On local examination, the penis was erect, engorged and demonstrated mild tenderness. Perineum, other local and systemic examination were within normal limit.

Bilateral corpora cavernosa appeared bulky on Ultrasonography (USG), along with prominent sinusoids. There was an increase in the vascularity (right > left), which appeared pulsatile. There was an aberrant communication noted between the cavernosal artery and the sinusoids at the base of right corpora cavernosa. On Doppler evaluation, it showed a peak systolic velocity of 182 cm/second. These findings were suggestive of a post traumatic arterial- sinusoidal fistula.

Computed Tomography (CT) Angiography revealed contrast extravasation involving the right corpora cavernosa in the arterial phase which increased in the subsequent phase. Right internal pudendal artery and the right dorsal artery of the penis (originating from the pubic branch of the obturator artery) appeared prominent. A fistulous communication was noted between the right dorsal artery of penis and the cavernosal sinusoids. (Figure 1,2,3)

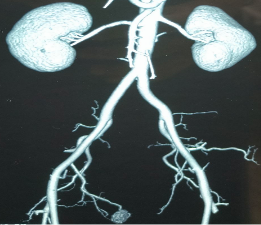


Figure 1: CT aortogram demonstrating contrast extravasation from the right dorsal artery of penis into corpora cavernosa



Figure 2: CT angiography demonstrating an axial view of contrast extravasation in the right corpora cavernosa suggestive of the fistula between dorsal artery of penis with cavernosal sinusoids.



Figure 3: CT angiography- coronal view demonstrating the fistula

Due to the failure of conservative management, the patient was counselled regarding the further treatment options. A decision for angioembolisation was taken in view of the high success rates and minimally invasive approach. Access was obtained via the left femoral artery. Right internal iliac artery angiogram showed a small focal active contrast leak in the penile body on the right, feeding vessel being the penile artery, arising from the right obturator artery (Figure 4).



Figure 4: Selective right internal iliac artery angiogram showing contrast leak from the dorsal artery of the penis

The culprit vessel was accessed using a combination of 4 Fr diagnostic catheter and SL 10 microcatheter. After super selective cannulation of feeding vessel, embolisation was performed using 33% NBCA (glue with lipiodol) (Figure 5).

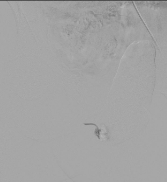


Figure 5: Glue cast during embolisation

Check angiograms done showed no further contrast leakage (Figure 6).



Figure 6: Post-embolisation angiographic run showing obliteration of the fistula.

Left internal iliac artery angiogram ruled out active bleed from the left side.

Post procedure, patient showed good recovery. Complete resolution was noted on the follow up USG. Patient recovered good penile erections within 2 months with support of PDE 5 inhibitors, which completely normalised within 6 months.

3. discussion

High flow or non-ischaemic priapism associated with genitoperineal trauma is a relatively uncommon entity, constituting less than 5% of all cases of priapism [7]. It is characterised by the formation of an abnormal arteriovenous shunt which leads to the persistent painless erect state of the penis even without sexual stimulation.

The diagnosis relies on a proper history, physical examination and an USG Doppler which helps to characterise the abnormality as well as differentiate it from low flow priapism. The usual pathognomonic finding being an arterial waveform with a high peak velocity, along with low resistance and the demonstration of the arteriovenous fistula [8]. CT scan can help to exclude other injuries as well as provide a surgical roadmap. Arteriography is currently combined with therapeutic interventions.

It is not a surgical emergency and hence treatment can be planned in a step ladder pattern. Conservative management with perineal compression and ice compresses, may help to achieve spontaneous resolution in approximately 62% cases [9,10]. It may help to induce vasospasm of the cavernous artery and promote clot formation, thereby occluding the fistula. Androgen deprivation therapy in the form of bicalutamide, leuprolide injections or ketoconazole, has also been reported as a treatment option for the closure of the fistula by reducing spontaneous as well as nocturnal erections [11]. However, the adverse effects like erectile dysfunction and distal penile flaccidity should be kept in mind while opting for conservative treatments [12]. Methylene blue which blocks the effect of nitric oxide has been tried but its use is discouraged because of the possibility of penile necrosis and formation of necrotic abscess [13].

In the case of failure of conservative measures, surgery and endovascular embolisation are the two possible options. For the surgical option, the internal pudendal artery or its involved branches are ligated. 10% to 50% patients report recovery of erectile function [14,15]. The other complications include gangrene of the penis, purulent cavernositis, gluteal ischemia and perineal abscess. With the advent of super-selective percutaneous trans-arterial embolisation, this option is reserved for the rare situations wherein embolisation fails.

Endovascular embolisation has shown very high success rates of more than 80%, with the added benefit of maintaining erectile function in majority of patients [16]. Temporary materials are considered a superior option for embolisation [1,17]. These include autologous blood clots, gelfoam, or sponge. They provide the advantage of decreased incidence of complications, but have the potential disadvantage of recurrence. The other option is the use of permanent materials, which include polyvinyl particles, microcoils and acrylic glue. Though they reduce the chances of recurrence, they are associated with an increased incidence of complications, especially for bilateral cases. Microcoil deployment carries several advantages including an accurate deployment, which is fast and ability to pack a cavity like a pseudoaneurysm. The accuracy is important to prevent the neighbouring tributaries from inadvertent obliteration. Due to its radiopaque nature, it can also help to locate the pseudoaneurysm. On the other hand, liquid agents are a better option in the case of multiple unilateral feeding vessels as they are associated with subsequent recanalization of the native arterial supply, which in turn helps to reduce the risk of erectile dysfunction in the future [18]. The potential complications include 5–39% risk of erectile dysfunction, gangrene of the penis, purulent cavernositis, gluteal ischaemia and the chance of recurrence in upto 30% cases [19].

A recent review by Nurfajri et al including 16 studies involving 52 patients, also concluded that angioembolisation is the preferred minimally invasive approach as of date with a success rate in almost 90% cases with successful preservation of potency [20].

4. Conclusion

Post traumatic non-ischemic priapism is a rarely encountered subtype. The clinical presentation is usually a delayed one and the diagnosis can be confirmed radiologically with CT angiography considered the gold standard. With the advent of minimally invasive therapy, angioembolisation is the most feasible option with the maximum benefit to preserve potency. Prompt intervention for non- resolving cases along with the support of medical therapy, may help in quick and complete recovery of erectile function.

Consent

All authors declare that ‘written informed consent was obtained from the patient for publication of this case report and accompanying images.

Ethical approval

All authors hereby declare that this case report was made in an ethical manner.

**Disclaimer (Artificial intelligence)**

Author(s) hereby declare that NO generative AI technologies such as Large Language Models (ChatGPT, COPILOT, etc.) and text-to-image generators have been used during the writing or editing of this manuscript.

References

1. Shigehara K, Namiki M. Clinical Management of Priapism: A Review. World J Mens Health. 2016 Apr;34(1):1-8. doi 10.5534/wjmh.2016.34.1.1
2. Song PH, Moon KH. Priapism: current updates in clinical management. Korean J Urol 2013;54:816–823. doi 10.4111/kju.2013.54.12.816
3. Greiner T, Schneider M, Regente J, Toto S, Bleich S, Grohmann R, Heinze M. Priapism induced by various psychotropics: A case series. World J Biol Psychiatry. 2019 Jul;20(6):505-512. doi 10.1080/15622975.2018.1520396
4. Broderick, G.A., et al. Priapism: pathogenesis, epidemiology, and management. J Sex Med, 2010. 7: 476. doi: 10.1111/j.1743-6109.2009.01625.x
5. Ricciardi, R., Jr., et al. Delayed high flow priapism: pathophysiology and management. J Urol, 1993. 149: 119. doi: 10.1016/s0022-5347(17)36017-2
6. Ingram AR, Stillings SA, Jenkins LC, An update on non-ischemic priapism: Sex Med Rev, 2020; 8; 140-49. doi 10.1016/j.sxmr.2019.03.004
7. H. Dang, C. Perazzini, S. Caudron, A. Ravel, E. Dumousset, P. Chabrot, *et al.* High-flow priapism: highly selective embolization of a traumatic arterio-cavernosal fistula Journal de medecine vasculaire, 47 (1) (2022), pp. 27-32. doi10.1016/j.jdmv.2021.11.001
8. Hakim LS, Kulaksizoglu H, Mulligan R, Greenfield A, Goldstein I. Evolving concepts in the diagnosis and treatment of arterial high flow priapism. J Urol 1996;155:541–8. PMID: 8558656.
9. Ilkay AK, Levine LA. Conservative management of high-flow priapism. Urology 1995; 46(3): 419–24. doi 10.1016/S0090-4295(99)80235-0
10. Arango O, Castro R, Dominguez J, Gelabert A. Complete resolution of post-traumatic high-flow priapism with conservative treatment. Int J Impot Res 1999; 11(2): 115–7. doi 10.1038/sj.ijir.3900382
11. Mwamukonda, K.B., et al. Androgen blockade for the treatment of high-flow priapism. J Sex Med, 2010. 7: 2532. doi: 10.1111/j.1743-6109.2010.01838
12. Zacharakis, E., et al. Early insertion of a malleable penile prosthesis in ischaemic priapism allows later upsizing of the cylinders. Scand J Urol, 2015. 49: 468. doi: 10.3109/21681805.2015.1059359
13. Melman, A., Serels, S. Priapism. Int J Impot Res 12 (Suppl 4), S133–S139 (2000). doi.org/10.1038/sj.ijir.3900592
14. O"Sullivan P, Browne R, McEniff N, et al*.* Treatment of "high-flow" priapism with superselective transcatheter embolization: a useful alternative to surgery. Cardiovasc Intervent Radiol2006;29:198–201. doi10.1258/arsr.2012.120028
15. Ji MX, He NS, Wang P, et al*.* Use of selective embolization of the bilateral cavernous arteries for posttraumatic arterial priapism. J Urol1994;151:1641–2. PMID: 8189586
16. Abujudeh H, Mirsky D. Traumatic high-flow priapism: treatment with super-selective micro-coil embolization. Emerg Radiol2005;11:372–4. doi 10.1007/s10140-005-0404-5
17. Numan F, Cakirer S, Işlak C, Oğüt G, Kadioğlu A, Cayan S, Tellaloğlu S. Posttraumatic high-flow priapism treated by N-butyl-cyanoacrylate embolization. Cardiovasc Intervent Radiol. 1996 Jul-Aug;19(4):278-80. PMID: 8755084.
18. Zacharakis E, Ralph DJ, Walkden M, Muneer A. Distal corpus cavernosum fibrosis and erectile dysfunction secondary to non-ischaemic priapism.Arch Ital Urol Androl 2015;87:258-9. doi 10.4081/aiua.2015.3.258
19. Cakan M, Altu Gcaron U, Aldemir M.Is the combination of superselective transcatheter autologous clot embolization and duplex sonography-guided compression therapy useful treatment option for the patients with high-flow priapism? Int J Impot Res 2006;18:141-5. doi 10.1038/sj.ijir.3901373
20. Nurfajri, Derri Hafa; Dahril, Dahril. Outcome angioembolization in patient with high-flow priapism: A systematic review. Urology Annals 17(2):p 69-73, Apr–Jun 2025. doi 10.4103/ua.ua\_94\_23