Priapism is defined as a state of prolonged erection of the penis, not related to sexual desire or stimulation. It can be classified as high-flow or low-flow depending on the status of the penile arterial blood flow. The more common type, low-flow priapism, is due to stasis and diminished blood efflux from the cavernous bodies; while the high-flow type reveals uncontrolled blood inflow. Most cases of high-flow priapism are related to perineal trauma, such as a straddle-type injury, in which the corporal artery is compressed against the pubic bone [1].

We report an adult patient with high-flow priapism due to combination of arteriocavernous fistula and pseudoaneurysm after perineal trauma. The patient was initially treated by bilateral selective microcoils embolizations. Detumescence was achieved within one hour. Unfortunately, a recurrent pseudoaneurysm was present during follow-up examination. Second embolization with blood clots and Gelfoam pledgets was hence performed. The recurrent pseudoaneurysm remained identified after the second embolization; however, decreased in size. The patient had no any discomfort such as recurrent priapism with the existence of the smaller pseudoaneurysm and he regained normal morning erection and normal sexual function two months after the first embolization.

**Key words: priapism; pseudoaneurysm; embolization**

High-flow priapism frequently occurs after perineal trauma resulting in uncontrolled arterial inflow into the corpus cavernosum. Although it presents in a non-ischemic state, persistent erection may result in hemostasis and consequent arteriolar occlusions leading to fibrosis of the trabecular tissues. Treatment is thought to be necessary for preventing permanent impotence [2]. Embolization is a choice of treatment. We report a patient with traumatic high-flow priapism who is treated by microcoils embolization successfully. A smaller pseudoaneurysm recurs, yet, has no influence on the patient’s normal sexual ability. After second embolization and serial follow-up, we conclude that a smaller recurrent pseudoaneurysm without symptoms can be left untreated and observed.

**CASE REPORT**

A 21-year-old man sustained a blunt perineal trauma when he fell down from a motionless motorcycle. He presented at our urologic outpatient clinic 7 days later for a persistent, painless erection, which was ignored by several urologists. Physical examination was essentially normal except for the partially erected penis. Color Doppler sonography revealed a homogeneous, hypoechoic lesion about 1 cm in size at the right side of penile root. Direct arterial flow into the lesion with turbulence was identified, and a pseudoaneurysm originating from a branch of left internal pudendal artery was suspected (Fig.1).

Bilateral internal iliac and internal pudendal arteriograms were then performed, which revealed a large pseudoaneurysm measuring about 1.61 cm x 1.78 cm at penile root, filled via small branches of bilateral cavernosal arteries, associated with cavernosal arteriovenous fistulas (Fig.2a and 2b). We accesses both feeding arteries with Rapid Transit microcatheter (Cordis, Miami, USA) matched with Transend glide microwire (Boston Scientific, CA, USA) for coil embolization. The left feeder artery was embolized with two 2mm x 10mm minicoils (Boston Scientific, CA, USA) and the right feeder artery was embolized with one minicoil of the same size. Follow-up right internal pudendal arteri-
ography and left internal iliac arteriography documented closure the fistula and obliteration of the pseudoaneurysm (Fig. 3a and 3b). The penis resumed to its flaccid state within one hour. Morning erection and erection associated with sexual stimulation were regained after embolization. However, penile pain during erection was sustained and thus full erection was not achieved.

Twenty-five days after the initial embolization, color Doppler sonography showed a recurrent pseudoaneurysm, which was smaller in size (Fig. 4). Repeat angiography confirmed the smaller pseudoaneurysm fed by the recanalized left cavernosal artery, while the right cavernosal artery remained obliterated (Fig. 5). Second embolization was then carried out in the left cavernosal artery proximal to the previously embolized site even though the penis remained flaccid. Five ml of autologous blood clots and small amount of Gelfoam pledgets (Pharmacia & Upjohn, Kalamazoo,

**Figure 1.** Color Doppler sonogram of the proximal right corpus cavernosum shows a homogeneous, hypoechoic lesion about 1cm in size. Direct arterial flow into the lesion with turbulence is present.

**Figure 2.** a. Right internal pudendal arteriogram in LAO view reveals a right cavernosal arteriosinusoidal fistula (arrow) and pseudoaneurysm formation (arrowhead). b. Left internal iliac arteriogram in RAO view reveals the pseudoaneurysm (arrowhead) and the arteriovenous fistula (arrow) also fed by left cavernosal artery.

**Figure 3.** a. Right penile arteriography in LAO view after microcoil embolization. The arteriocavernosal fistula is no longer evident and the pseudoaneurysm is not opacified. Microcoils in feeding arteries (arrow) are depicted. b. Selective left internal iliac angiography in AP view after embolization with microcoils. The arteriocavernosal fistula and the pseudoaneurysm are closed. Microcoils in feeding arteries (arrow) are depicted.
USA) were chosen as the embolic materials. Complete occlusion was appreciated on the post-embolization arteriography (Fig.6). The pseudoaneurysm was still depicted on the color Doppler sonography done 2 days later with decreasing size. The penis remained flaccid and had normal erectile function even with the existence of the smaller residual pseudoaneurysm. The patient resumed normal sexual activity 2 months after the first embolization.

**DISCUSSION**

Superselective embolization has been reported as a safe and effective method to reverse the high flow state of high-flow priapism[3]. Several materials are used for embolization, including autologous blood clots, Gelfoam pledgets, n-butyl-cyanoacrylate, Ethicon and microcoils [4-10]. Autologous blood clots and Gelfoam pledgets are easily available and handled, but since they are not radiopaque, precise localization of occlusion can be difficult. They provide temporary vessel occlusion for days to weeks. The polymerized n-butyl-cyanoacrylate firmly adheres to the surrounding endothelium, producing permanent vessel occlusion. It is cumbersome to use and needs expertise to avoid severe complication [11,12]. We choose microcoils as our embolic materials because we can access the small feeding arteries with microcatheter and embolize precisely just proximal to the pseudoaneurysm. It is especially important as we might embolize bilateral cavernosal arteries. Microcoil, a permanent embolizer, has been used more and more recently; however it is seldom used bilaterally for fear of affecting potency. Only two cases have been reported to undertake bilateral microcoils embolization without any sequale [13,14]. Our patient further evidences the safety of bilateral cavernosal arteries embolization with metallic microcoils.

Furthermore, after initial successful embolization of the arteriocavernosal fistula and pseudoaneurysm with microcoils, recanalization occurs during follow-up. As mentioned in the previous statement, the recurrent pseudoaneurysm is smaller, unilateral, and the arteriocavernosal fistula is not significant. The patient does not encounter any discomfort or recurrent pri-

---

**Figure 4.** Color Doppler sonography of penis 25 days after first embolization reveals a recurrent pseudoaneurysm.

**Figure 5.** Left internal pudendal arteriogram in RAO view performed 25 days after initial embolization shows recanalization of the embolized cavernosal artery and a smaller pseudoaneurysm (arrowhead).

**Figure 6.** The left internal pudendal arteriogram after second embolization documents complete obliteration of the pseudoaneurysm. Microcoils in feeding arteries (arrow) are depicted.
apism. Therefore, we choose autologous blood clots and Gelfoam pledgets as second embolic materials. Only one similar case has been reported [15], however, the patient suffered from recurrent priapism several hours after complete detumescence.

On retrospectively review, we think that the second embolization may be unnecessary because the high-flow state has been corrected through occlusion of the arteriocavernosal fistula. The existence of the smaller pseudoaneurysm does not lead to recurrent priapism and the patient has a nearly normal erectile function. Delayed spontaneous obliteration of the pseudoaneurysm can be possible. We have reviewed 25 case reports of high-flow priapism treated with transcatheter embolization, progressive restoration of the premorbid erectile function are recorded and may delay for up to several months [4-10]. Our patient regains normal sexual activity 2 months after the first embolization with a residual smaller pseudoaneurysm. Thus, continuous observation may be a better choice when we discover a recurrent pseudoaneurysm after successful embolization as long as the patient is symptom-free.

CONCLUSION

We conclude that post-traumatic high-flow priapism can be treated safely by superselective bilateral microcoil embolizations without complication. Recanalization of the embolized vessel and recurrence of pseudoaneurysm may occur after successful occlusion of the feeding artery. The smaller, persistent pseudoaneurysm may not lead to recurrent priapism, and thus, further embolization may not be necessary. Long-term follow-up for evaluation of the embolized vessel, pseudoaneurysm and the recovery of erectile function is justified.

REFERENCES

以微線圈治療高血流性持續性勃起的經驗：病例報告

蔡蕙怡  吳定國  王建國  劉金昌  石明誠

高雄醫學大學附設中和紀念醫院  放射線科

本篇報告一例成年男性因外傷引起高血流性持續性勃起合併有動脈海綿體腫管及假性動脈瘤。我們以微線圈經由兩側海綿體動脈成功地栓塞，此病例特殊處在於栓塞後有較小的復發假性動脈瘤，但不影響病人的正常勃起能力，也沒有造成持續性勃起的再發生。病人又接受了第二次的栓塞治療，但是假性動脈瘤仍持續存在。距離第一次栓塞兩個月後，這個病人恢復正常的性生活。因此我們認為復發的假性動脈瘤若未造成症狀並不需要急著再做第二次的栓塞而應以追蹤為首要考量。此外這個病例又再一次見證了使用微線圈栓塞兩側海綿體動脈的安全性。

關鍵詞：持續性勃起, 假性動脈瘤, 栓塞