Asian Journal of Andrology (2017) 19, 509–510
www.asiaandro.com; www.ajandrology.com

Open Access

LETTER TO THE EDITOR

Erectile Dysfunction

Endovascular treatment of recurrent erectile dysfunction due to venous occlusive disease

Alberto Rebonato[1], Daniele Maiettini[1], Claudio Ceccherini[2], Alessandro Nuti[1], Franco Sanguinetti[2]

Asian Journal of Andrology (2017) **19**, 509–510; doi: 10.4103/1008-682X.179160; published online: 6 May 2016

Dear Editor,

We have read with great interest the excellent review by Kim *et al.*[1] which reports the tools available in interventional radiology (IR) to face the frustrating problem of impotence. The social and psychological implication of this pathology drove the effort of scientific medicine searching for a solution for centuries.[2]

As known, the etiology of vasculogenic Erectile Dysfunction (ED) is complex and multifactorial providing either arterial or venous dysfunction, and the precise interplay of all physiologic mechanisms involved is not completely understood. Vasculogenic ED offers the opportunity to exploit modern IR techniques restoring compromised arterial inflow in case of artery insufficiency or reducing venous outflow in case of veno-occlusive dysfunction (VOD).

The paper exhaustively reports the state-of-the art on this topic discussing endovascular embolization techniques and the inherent limitations. The ZEN (Zotarolimus-Eluting Peripheral Stent System for the Treatment of Erectile Dysfunction in Males with Suboptimal Response to PDE5 Inhibitors) trial well represents a modern option to treat the inadequate arterial inflow to corpora cavernosa.[3] However, normal pelvic vascular anatomy and the correlation between the pelvic arterial disease and the ED are still not clear, and further studies are necessary to better define the role of pudendal stenting.[1]

The physiology of VOD was demonstrated in the 1970s;[4] patients suffering of ED due to VOD, usually have damage to the corporeal smooth musculature or the tunica albuginea, or both, which results in impairments of vascular dilation. Hence, penis veins were the subject of medical and nonmedical therapies for centuries as the "penile ring" system could prove.[5]

Concerning the VOD and the penis deep dorsal vein (DDV), the option of surgical ligation, although developed some decades ago, was improved in the last years with encouraging outcomes.[6] Kim *et al.*[1] clearly underline the role of the embolization techniques and their limitations dealing with VOD. The authors report the work of Aschenbach *et al.*[7] which obtained an 88.8% clinical success rate after endovascular internal pudendal vein embolization therapy with histoacryl-lipiodol using a trans-femoral approach. The retrograde approach of the technique requires a bilateral selective catheterization of the internal pudendal veins without the possibility of embolizing the external pudendal vein, the periprostatic venous plexus, and the DDV. In fact, many papers were published referring to the embolization techniques of the deep dorsal vein and the related efferents (internal and external pudendal veins and the periprostatic venous plexus).[8,9]

Figure 1: (**a**) After the vein was punctured with a 20-gauge needle, a 0.018" guide wire was gently advanced under fluoroscopic guidance; note the coil delivered in the previous treatment (black arrow). (**b**) Venography showing the persistent bilateral venous leakage despite the previous retrograde embolization with coils (black arrows). (**c**) Contrast venography after partial embolization (N-butyl-2-cyanoacrylate and Lipiodol in a 1:1 ratio) of the internal pudendal veins showing the maintained partial patency of the left internal and external pudendal veins. (**d**) Final venography showing the complete embolization of the periprostatic venous plexus (note the radiopaque embolic mixture without subtraction).

At our institution, we developed a minimally invasive technique with an anterograde approach of the DDV under US-guided puncture.[10] Subsequently, we performed the selective catheterization and embolization under fluoroscopic guidance of the periprostatic plexus and both the internal and external pudendal veins, using N-butyl-2-cyanoacrylate (NBCA). We are convinced that this approach

[1]Radiology Unit, Department of Surgical and Biomedical Science, Santa Maria della Misericordia Hospital, Perugia University, 06132 Perugia, Italy;
[2]Radiology Department, ASL 1 Massa-Carrara, 54033 Carrara, Italy.
Correspondence: Dr. A Rebonato (rebonatoalberto@gmail.com)
Received: 01 December 2015; Revised: 05 January 2016;
Accepted: 10 March 2016

allows an optimal occlusion of the venous outflow from the corpora cavernosa. The anterograde approach improves catheter placement and maneuverability owing to the short distance between the vascular access and the point of glue delivery; moreover, the downstream glue delivery allows a controlled and safe embolization.

Concerning this issue, we would like to report the case of a 30-year-old man, suffering of VOD, who underwent a trans-femoral internal pudendal vein embolization. After 6 months of clinical success, the patient had a recurrence. Ten months later, the patient referred at our institution, complaining for an ED not responding to oral pharmacotherapy (PDE5 inhibitors). The patient first underwent a clinical evaluation by an endocrinologist to rule out psychogenic causes; then, a color Doppler flow analysis confirmed a significant and persistent VOD (high systolic flow rate >25 cm s^{-1} and a persistent end-diastolic velocity, EDV, >5 cm s^{-1}, 15 min after the intracavernosal injection of 20 mg alprostadil, with a resistive index of 0.75) and we decided to perform the embolization of the periprostatic venous plexus with the aforementioned anterograde approach. The venography showed a persistent bilateral venous leakage despite the previous retrograde embolization with coils (**Figure 1a** and **1b**). The anterograde periprostatic plexus embolization was successfully performed (**Figure 1c** and **1d**) and confirmed at color Doppler flow analysis 2 months after the procedure (EDV <5 cm s^{-1}). The patient is still experiencing clinical benefits without diminishing the improvement of the erectile function at a 15-month follow-up.

In our institution, we are recruiting more patients to update the results of anterograde embolization. There are small evidence concerning these promising endovascular techniques and we need further studies to better understand the long-term follow-up. Even so, embolization techniques should be considered in all the cases of confirmed ED due to VOD, especially in young patients. Although the technique is not always successful restoring completely the erectile function, in most cases, the patients have a satisfactory erectile function just resorting to oral pharmacotherapy (PDE5 inhibitors), delaying the time to penile prosthesis.

AUTHOR CONTRIBUTIONS

DM, AR, and CC performed the literature search and drafted the manuscript. FS and AN revised the manuscript and performed the procedure described in the paper. All authors read and approved the final manuscript.

COMPETING INTERESTS

All authors declare no competing interests.

REFERENCES

1 Kim ED, Owen RC, White GS, Elkelany OO, Rahnema CD. Endovascular treatment of vasculogenic erectile dysfunction. *Asian J Androl* 2015; 17: 40–3.
2 Hunter DW. Impotence: a frustratingly elusive target. *J Vasc Interv Radiol* 2014; 25: 873–4.
3 Rogers JH, Goldstein I, Kandzari DE, Köhler TS, Stinis CT, *et al*. Zotarolimus-eluting peripheral stents for the treatment of erectile dysfunction in subjects with suboptimal response to phosphodiesterase-5 inhibitors. *J Am Coll Cardiol* 2012; 60: 2618–27.
4 Fournier GR Jr., Juenemann KP, Lue TF, Tanagho EA. Mechanisms of venous occlusion during canine penile erection: an anatomic demonstration. *J Urol* 1987; 137: 163–7.
5 Fiałkowski T, Cegielski M. Incarceration of the penis in a metal ring. *Pol Przegl Chir* 1954; 26: 419–27.
6 Zhang B, Chen J, Xiao H, Zhang Y, Cai L, *et al*. Treatment of penile deep dorsal venous leakage of erectile dysfunction by embedding the deep dorsal vein of the penis: a single center experience with 17 patients. *J Sex Med* 2009; 6: 1467–73.
7 Aschenbach R, Steiner T, Kerl MJ, Zangos S, Basche S, *et al*. Endovascular embolisation therapy in men with erectile impotence due to veno-occlusive dysfunction. *Eur J Radiol* 2013; 82: 504–7.
8 Kutlu R, Soylu A. Deep dorsal vein embolization with N-butyl-2-cyanoacrylate and lipiodol mixture in venogenic erectile dysfunction: early and late results. *Radiol Oncol* 2009; 43: 17–25.
9 Chocholatv M, Hanek P, Jarolim L, Padr R. Embolization of the deep dorsal vein using 96% ethanol for treatment of the venogenic erectile dysfunction. *Eur Urol Suppl* 2010; 9: 643.
10 Rebonato A, Auci A, Sanguinetti F, Maiettini D, Rossi M, *et al*. Embolization of the periprostatic venous plexus for erectile dysfunction resulting from venous leakage. *J Vasc Interv Radiol* 2014; 25: 866–72.