A case report of right cardiac ventricle perforation by uncontrolled embolization coil inserted for treating penile veno-occlusive dysfunction

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A B S T R A C T

Coil embolization (CE) is believed effective-safe for treating penile veno-occlusive dysfunction (VOD). From 2012 to 2016, refractory impotence prompted four men to seek further treatment, although they underwent six CEs elsewhere. Uncontrolled coils scattered along penile drainage veins including the deep dorsal veins (n = 3), periprostatic plexus (n = 1), iliac vein (n = 1), right pulmonary artery (n = 2), left pulmonary artery (n = 1), and right ventricle (n = 1). The last one occurred in a 40-year-old house builder, and the coil perforated the right ventricle wall and diaphragm 18 months later. Given no sustainable improvement, CE’s safety and efficacy are unreliable for treating patients with VOD.

1. Introduction

The discovery of phosphodiesterase type 5 (PDE-5) inhibitors led to the availability of quality oral medications for treating erectile dysfunction (ED). However, some ED patients still do not respond to this group of agents, particularly young males suffering from veno-occlusive dysfunction (VOD). VOD is the exclusive pathology in those whose ED results from heavy smoking; should VOD be the most prevalent contributor to ED? Given that there is a paucity of natural cures for treating ED resulting from VOD. Still, all ED patients resort globally to the first line of oral PDE-5 inhibitors. Then, patients resort to the second-line treatment strategies if they are poorly responsive to the oral agents. Second-line options include vacuum constriction devices, vasodilator injection, endovascular therapies, etc. The penile implants remain the most reliable and final solution among those ED treatment options, though unacceptable complications—mechanical failure, infection, and prosthesis extrusion—still sometimes occur.

Penile vascular interventions aim to treat VOD or arterial insufficiency by limiting blood outflow or increasing arterial inflow in the penis. Many physicians and patients consistently seek improvements in these procedures. Exemplified by pudendal stents and penile coil embolization (CE) were advised to treat arterial insufficiency and VOD, respectively. However, the long-term efficacy of CE is not beyond controversy, and its safety may not be sustainable, albeit it is considered minimally invasive. We report an astonishing complication resulting from an uncontrolled coil in a patient who underwent penile CE elsewhere internationally.

2. Cases presentation

A 1974-born house builder had suffered from ED since his youth. A common flu. In May 2016, he revisited us. A chest X-ray showed coils parked in the right heart ventricle (Fig. 1B, arrow). A cardiac echocardiography further confirms it. Although he benefited from our ambulatory surgery before (Fig. 1C) and after penile venous stripping (Fig. 1D), he experienced frequent coughs with susceptibility to the common flu. In May 2016, he revisited us. A chest X-ray showed coils (Fig. 1E), and a spiral CT demonstrated the ventricle coil’s further migration and perforation to the right ventricle wall and diaphragm (Fig. 1F, arrow). To have a comprehensive overview, Table 1 shows his

Abbreviations: CE, Coil embolization; VOD, veno-occlusive dysfunction; ED, erectile dysfunction; PDE-5, phosphodiesterase type 5.

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https://doi.org/10.1016/j.eucr.2022.102166
Received 12 June 2022; Received in revised form 10 July 2022; Accepted 16 July 2022
Available online 20 July 2022
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Fig. 1. Imaging of a 42-year-old house builder. A. Chest X-ray film discloses five coils lodged in the pulmonary regions in November 2014. B. Imaging of contrast CT scan shows one coil stuck in the right ventricle wall (white arrow). C. Before penile venous stripping, a cavernosogram was obtained. At the same time, a 20 mL omipaque solution was injected via the 19G scalp needle (white asterisk) into the corpora cavernosa (black sharp). Note the deep dorsal vein insertion, white arrow). E. Follow-up chest X-ray demonstrated five coils lodged in the pulmonary area, and one coil migrated further (black arrow) in May 2016. F. A film of spiral CT scan demonstrates the previous stuck coil (black arrow) perforating the right ventricle wall (white arrow).

Table 1
Demographics of a 1972-born patient whose right ventricle was perforated by an uncontrollable inserted coil.

| Item | Occurred time | Symptoms | Signs |
|------|---------------|----------|-------|
| ED  | 1990 | Early detumescence of rigid erection | Veno-occlusive dysfunction after a multiplanar diagnosis workup. |
| CE  | 2000 | The above symptoms improved till 2003, followed by the occasional cough. | |
|  |  | | Chest-Ray: Two and three coils on the right and left pulmonary, respectively. Echo-cardiography and contrast CT disclosed a coil in the right ventricle. |
|  | Nov. 2014 | | The uncontrolled coil perforated the right ventricular wall. |
|  | May 2016 | | |

a ED is the abbreviation of erectile dysfunction.
b CE is the abbreviation of coil embolization.

demography, conspicuously the astonishing complication of the right heart ventricle perforated by the uncontrollable coils.

From 2012 to 2017, four young men visited our institute with six episodes of CE for treating VOD elsewhere with no noticeable improvement. Inserted coils scattered along with the cardiovascular circulation system inside and outter, particularly erection-related veins of the corpora cavernosa, including the deep dorsal veins (n = 3), periprostatic plexus (n = 1), iliac vein (n = 1), right pulmonary artery (n = 2), left pulmonary artery (n = 1), and right ventricle (n = 1) with cardiac wall perforation in 18 months.

3. Discussion

Although CE was incepted in 1985 for treating venous leakage by inserting detached coils into the deep dorsal vein. In this report, all four patients were plagued with ED before age 23 and received CE from 2000 to 2015. Implies CE is contemporarily used for treating VOD. CE is safely-effective in treating disease entities such as brain aneurysms and intractable epistaxis in the organ where its blood perfusion and drainage amount are not tremendous. On the elusive ED issue, what great news to patients if CE works. Among options for treating VOD, CE is an old paradigm newly revisited by the interventional radiologist. It is generally safe, although the surprising morbidity described here underscores that this procedure warrants being watchful, as physicians strive not to harm daily practice.

There is just one out of our four patients whose inserted coils are still parked in the deep dorsal vein; thus, migration is at the expense of a high-like hood. Two patients underwent EC in the north and south hemispheres, respectively. We can tell the inserted coils varied in size, shape, and metal radiopacity plausibly resulting from the manufacturer. Difference and astonishing parallel susceptibility, which implies inserted coil migration highly occurs. In the human penis full erection, CC arterial inflow increases from 2 to 3 ml/min to 60–80 ml/min, and so does the CC venous drainage outflow. Thus, CC venous drainage flow is 30–40 times elevated in each sexual bout. Implies a penile CE is at risk of migrating coils throughout the cardiac vascular system. In this report, inserted coils took many years to lodge in the right cardiac ventricle, though it took 18 months to traverse the pericardium and diaphragm. CE warrants research for treating ED resulting from VOD.

In summary, we found that migrating coils parked until an imped ance encounter. Penile CE may occur at the risk of an intolerable complication, and physicians should inform this possibility in choosing CE for treating ED resulting from VOD.

Declaration of competing interest

None of the contributing authors have any conflict of interest, including specific financial interests or relationships and affiliations relevant to the subject matter or materials discussed in the manuscript.

Acknowledgment

We want to thank Director Hsiu-Chen Lu and Ms. Venus Ying-Hui Chen for their preparation of photos for this manuscript.

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