



## Case Report

# Polyacrylamide hydrogel pulmonary embolism—A fatal consequence of an illegal cosmetic vaginal tightening procedure: A case report



Yijie Duan<sup>a</sup>, Lin Zhang<sup>a</sup>, Shangxun Li<sup>b</sup>, Yi Yang<sup>a</sup>, Jingjun Xing<sup>a</sup>, Wenhe Li<sup>a</sup>,  
Xinmei Wang<sup>c,\*\*</sup>, Yiwu Zhou<sup>a,\*</sup>

<sup>a</sup> Department of Forensic Medicine, Huazhong University of Science and Technology, Tongji Medical College, No. 13 Hangkong Road, Hankou, Wuhan, 430030, PR China

<sup>b</sup> Department of Public Security of Hubei Province, No.181 Xiongchu Avenue, Wuhan, 430070, PR China

<sup>c</sup> Central Hospital of Zibo, No. 54 Gongqinguan West Road, Zibo, 255036, PR China

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## ABSTRACT

Vaginal tightening is a kind of esthetic surgery aimed at enhancing sexual satisfaction during intercourse. Although the injective vaginal tightening procedure is informal, there are already some reports of its application. But pulmonary embolism is a really rare therapeutic complication of this procedure. We report a case of death due to the non-thrombotic pulmonary embolism as a consequence of illegal cosmetic vaginal-tightening procedure using polyacrylamide hydrogel. A 34-year-old woman was hospitalized with paroxysmal abdominal cramps and diarrhea as initial symptoms, while she concealed the genital cosmetic surgery history. Respiratory distress presented only 1.5 h before she died. The result of autopsy revealed the cause of death as pulmonary embolism due to the hydrogel which was injected into her vaginal wall. The emboli were confirmed as polyacrylamide hydrogel by Alcian-blue stain and the Fourier transform infrared scanning. It is suggested that pulmonary embolism should not be discarded in the expertise of deaths following cosmetic implant surgeries. It broadens our understanding about death associated with esthetic genital procedures and informs clinicians and medical examiners of the potential death of this type. And detailed investigations of previous medical and surgical history will always play a critical role in the certification of cause of death.

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## 1. Introduction

Female esthetic genital surgery, a relatively new category in the field of cosmetic and plastic surgery, has become a fashionable issue nowadays. This type of operation is usually performed by gynecologists in order to repair the genital size, appearance and function after obstetrical delivery, perineorrhaphy, intersex and transsexual surgical procedure, before the appearance of plastic procedures [1]. Such procedures promised sexual enhancement and cosmetic improvement for both women and their sexual partners. Female esthetic genital surgery mainly includes vaginoplasty/vaginal rejuvenation/vaginal tightening, perineoplasty,

labia minora labiaplasty, clitoral hood reduction, labia majora augmentation, and G-spot amplification [2]. The American College of Obstetricians and Gynecologists' Committee has warned that absence of data supporting the safety and efficacy of these procedures makes their effects untenable [3], but this cannot abate women's enthusiasm for trying to enhance function, appearance, and self-confidence of their bodies.

Vaginal tightening surgery appeared in the mid-1950s and no standardization of the procedures exists to date. Usually, the gynecologists or cosmetic surgeons perform anterior colporrhaphy, high-posterior colporrhaphy, excision of the lateral vaginal mucosa, or a combination of the above to reduce the caliber of the vaginal canal for the purpose of tightening the relatively lax vagina [2,4,5]. And these techniques are derived from the classic gynecologic surgical treatments applied to pelvic floor defects, such as cystocele, rectocele and enterocele [4]. Despite the techniques utilized, filler injection remains experimental, and there are already some reports of their application. The implants mentioned in the literatures include autologous fat, the bulking

\* Corresponding author. Tel.: +86 27 83657925; fax: +86 27 83692638.

\*\* Corresponding author. Tel.: +86 13053305520.

E-mail addresses: [gerichtsarzt@hotmail.com](mailto:gerichtsarzt@hotmail.com) (Y. Duan), [lyre2008@126.com](mailto:lyre2008@126.com) (L. Zhang), [lishangxun@gmail.com](mailto:lishangxun@gmail.com) (S. Li), [szomult@sina.com](mailto:szomult@sina.com) (Y. Yang), [jingjunx@126.com](mailto:jingjunx@126.com) (J. Xing), [18707165089@163.com](mailto:18707165089@163.com) (W. Li), [soul\\_jaejin\\_2000@163.com](mailto:soul_jaejin_2000@163.com) (X. Wang), [zhouyiwu@outlook.com](mailto:zhouyiwu@outlook.com) (Y. Zhou).

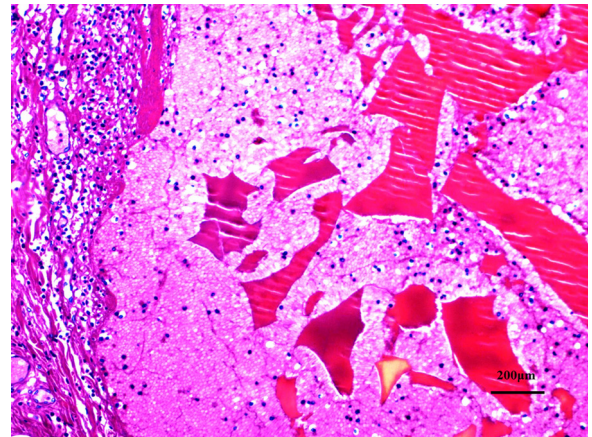
agent, hyaluronic acid, and silicone [2,6,7]. In clinical and forensic practice, death associated with non-thrombotic pulmonary embolism (NTPE) caused by injection for vaginal tightening is rare. There is no report about this type of death in existing literatures. Only Park et al. [6] reported a case of NTPE due to hyaluronic acid injection for G-spot amplification in which the patient was alive.

Here, we report the case of a woman who died of NTPE due to illegal cosmetic vaginal tightening procedure using polyacrylamide hydrogel (PAAG).

## 2. Case report

A 34-year-old woman was admitted in hospital for paroxysmal abdominal cramps and watery diarrhea for several hours, as well as tenesmus, nausea and vomiting. Physical examination showed a weak patient with pale skin and mucosa, tachycardia and local tenderness below the xiphoid region. The admitting diagnosis was shock of undetermined origin and suspected bromatoxism. She was treated with intravenous ofloxacin and metronidazole; however, she died of cardiopulmonary arrest 6 h after admission. Medical history profile showed that the deceased underwent vaginal tightening surgery by injecting PAAG (Amazing Gel) into vaginal wall 1 day earlier.

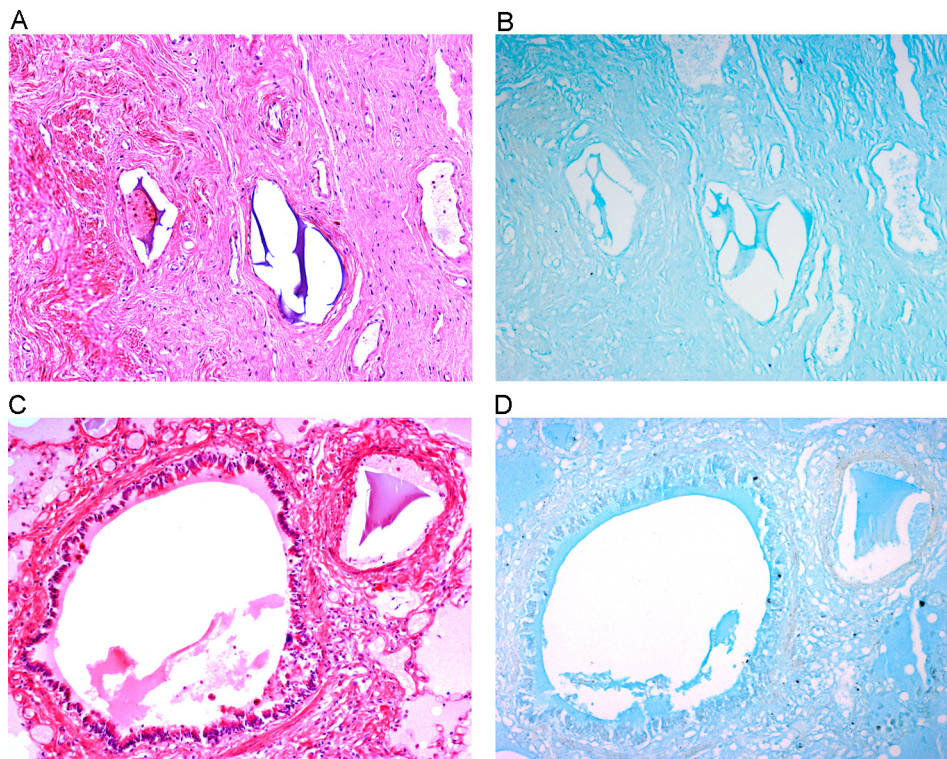
Forensic necropsy was performed 24 h after her death. External examination showed a well-nourished adult woman without any signs of mechanical injury and mechanical asphyxia. Blood clots were seen in the perineum and vagina. Internal examination revealed edematous lungs with diffuse petechiae. Multiple hemorrhages were observed in several locations, including serosa, mucosa of small intestine, and pancreas. Splinter hemorrhages were found on the serosa and corresponding submucosa of the fundus vesicae. On incision of the dextral vaginal wall, several hematomas and bloody gelatinous material were found.



**Fig. 1.** Hematomas containing jelly-like amorphous substance formed in vaginal wall (HE stain,  $\times 100$ ).

Significant hematomas were found in the vaginal wall, as well as a jelly-like amorphous substance (Fig. 1), fibrinous exudate, and prominent infiltration of inflammatory cells. Furthermore, blood vessel in submucosa and muscular layer of vagina were filled with a basophilic amorphous material. Interestingly, the basophilic material was also found in the vessels of lungs with severe pulmonary edema and focal pulmonary hemorrhages. No such material emboli were found in other organs. The samples of vaginal wall and pulmonary emboli were processed with Alcian-blue staining, and the gelatinous material were positive (Fig. 2).

Infrared spectra were obtained by FTIR (Thermo Scientific Nicolet TM7500-II, USA) equipped with continuum infrared microscope under the guiding of the unstained section. Infrared spectra were recorded in the range of  $4000\text{--}900\text{ cm}^{-1}$  at a



**Fig. 2.** (A) Basophilic gel emboli in blood vessel in submucosa and muscular layer of vagina (HE stain,  $\times 200$ ); (B) the emboli in vaginal wall stained positive (Alcian blue stain,  $\times 200$ ); (C) emboli in pulmonary vessels and alveolar capillaries (HE stain,  $\times 200$ ); (D) the gelatinous material in pulmonary arterioles was positive (Alcian blue stain,  $\times 200$ ).

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