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*Petr Hejna,*[1] *M.D.*

# A Case of Fatal Spontaneous Varicose Vein Rupture—An Example of Incorrect First Aid

**ABSTRACT:** Severe external bleeding due to varicose vein rupture is a rare complication of this frequent venous pathology. Venous bleeding can be very intensive and can be mistaken for arterial hemorrhage. A rare case of fatal varicose vein rupture with an example of an incorrect and ineffective first-aid technique in a 43-year-old man is reported here with a review of the recent literature. The victim was found on a sand stack, not far from his domicile in a large pool of blood. The external examination revealed a flat ulcer on the internal surface of the right shank. On dissection, the lesion contained a perforation that was continuous with superficial veins arising from a varicosed saphenous vein. The man tried to give himself first aid, due to the massive bleeding that he probably predicted arterial bleeding and applied the ligature closer to the heart above the bleeding defect, thereby not stopping the venous bleeding but exacerbating it. Death was caused by a hypovolemic shock because of external hemorrhage from a varicose vein.

**KEYWORDS:** forensic science, varicose veins, fatal hemorrhage, sudden death, ulceration, case report

Varicose veins are any dilated, elongated, and tortuous veins irrespective of size. Varicosities are common in the superficial veins of the legs, which are subject to high pressure when standing. Besides cosmetic problems, varicose veins often cause pain, especially when standing or walking and may be a source of serious complications. Usual complications include peripheral edema, skin pigmentation, white atrophy, dermatitis, skin ulcers, especially near the ankle (venous ulcers), and lipodermatosclerosis. More rare but possibly life-threatening complications include development of carcinoma or sarcoma in long-standing venous ulcers, blood clotting within affected veins, acute fat necrosis, and severe bleeding either spontaneous or from minor trauma (1).

Severe or even fatal bleeding from a ruptured varicose vein is a very rare phenomenon in the clinical and forensic practice. Only few cases of fatal bleeding due to ruptured peripheral varicosities have been described worldwide (2–9). One case of fatal varicose vein rupture with an example of an incorrect and ineffective first-aid technique is reported here with a review of the recent literature.

## Case Report

The victim was a 43-year-old man found on a sand stack, not far from his domicile. At a distance of about 200 m away from where he was found, continuous traces of blood were also found (Fig. 1). Three blood pools along these traces were very extensive (estimated blood loss for each pool was 500–1000 mL). The man laid on his back, and under his right shank was a large pool of blood (500 mL, Fig. 2). Another four large deposits of blood were situated on the snow in close proximity to the body of the man. At the level of the victim's right knee two ligatures were applied, the first ligature in the form of a chequered fabric of shirt, and the second one made of handkerchiefs. These ligatures were tightened only freely. A third ligature in the form of a scarf was found about 100 m from the place of death. The fabric of the scarf as well as the right shoe was completely saturated with blood; voluminous blood clots were also inside the right shoe (500–1000 mL). The total blood loss was estimated to be about 3000–4000 mL.

The man was known for superficial varicosity of the lower limbs, the rest of his medical history was unremarkable. During the autopsy, the skin of the lower limbs was atrophic and discolored greyish brown (more intensive on the right shank) with tortuous varicose veins present on the right lower leg. The right ankle was swollen and firm (brawny edema). Blood was smeared on the hands, right thigh, shank, and right ankle. On the internal surface of the right shank a flat ulcer ($5 \times 3$, 5 cm, Fig. 3) was situated. The lesion at the lower margin contained a small perforation that was continuous with the superficial varicose vein (arising from a great saphenous vein, Fig. 4). The edges of the venous ulcer were pale and rolled; the base of the lesion was yellow red. No traumatic lesions were found.

Other significant autopsy findings include moderate atherosclerosis of the coronary arteries and aorta, focal fibrosis in the myocardium, fatty liver disease, and obesity. In the victim's blood an alcohol level of 1.1 g/kg was revealed, and in the urine the level of alcohol found was 1.19 g/kg. Other toxicological investigations were negative. Death was attributed to massive external hemorrhage due to ulceration of the superficial varix of the right inferior limb.

## Discussion

Since the first study by Evans et al. (2) in 1973, only a few further cases of sudden death due to fatal external hemorrhage caused by varicose veins have been described in the literature. Some of the reported cases resulted from trauma (5,6), while other ones were spontaneous events (3,7–9). Venous bleeding can be very intensive and can quickly lead to a loss of consciousness and death. In some cases, bleeding due to high venous pressure is so massive that it can be mistaken for arterial hemorrhage (10). In rare instances an atypical bloodstain pattern may be a result of the rupture of varicose vein with pulsating hemorrhage, which may evoke arterial gushing. Large blood loss and unusual bloodstain patterns

[1]Institute of Legal Medicine, Charles University, Prague, Czech Republic.

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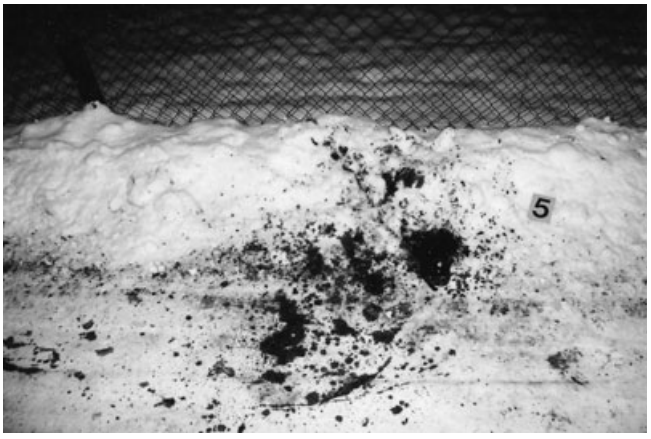


FIG. 1—*Blood evidence at the scene of death with typical bloodstain pattern in varicose vein rupture.*

FIG. 2—*Victim's right shank with ulcer in a pool of blood at the scene of death.*

FIG. 3—*A flat venous ulcer on internal surface of the right shank. Two ligatures at the level of the victim's knee are visible. The metal probe is inserted into the perforation of the wall of the varicose vein.*

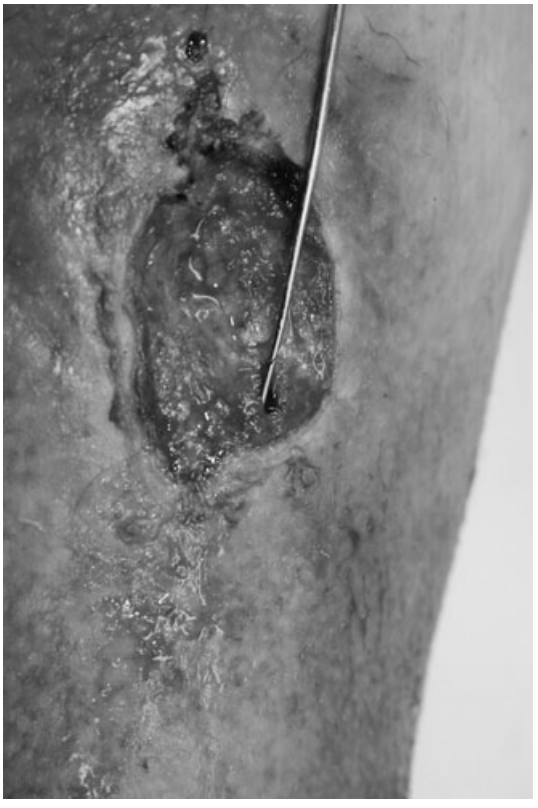

FIG. 4—*Closer view of the lesion seen in Fig. 3.*

at the scene of death may prompt the idea of a violent death. Victims are mostly older people living alone (1). Older people usually have more fragile skin and soft tissue that is more susceptible to injury.

Fatal bleeding may occur as a result of a spontaneous rupture of an intact varix or as an effect of a minor trauma. Sometimes hemorrhage may occur from chronic venous ulceration into a superficial varix (as in the presented case), or from more severe trauma, which can cause laceration of skin and subcutaneous soft tissue overlying a varix (5,6).

In cases of fatal venous bleeding from varicose veins, failure to provide first aid may be linked to the lack of attention given to small, continuous, and painless venous bleeding. Failure to recognize life-threatening bleeding may be related to other underlying psychiatric or neurological disease, as bleeding usually affects older individuals with coincidental diseases. Musculoskeletal disease or weakness associated with serious organic diseases may also limit the general ability to deal with hemorrhage. Social isolation can also play a considerable role in terms of the availability of first aid (1).

The influence of alcohol and drugs can affect self-preservation in a negative sense. Alcohol may significantly promote bleeding due to systemic vasodilation. Anticoagulant medications may

enhance the speed of bleeding and predispose an individual to consequential bleeding from apparently trivial lesions.

In the presented case the victim tried to give himself first aid. Due to the massive bleeding the man probably predicted arterial bleeding and applied the ligature closer to the heart above the bleeding defect, thereby not stopping the venous bleeding but exacerbating it (incorrect application of a ligature can be just as harmful as a general lack of knowledge concerning what to do in such situations). The man probably thought that the application of the ligature on the inferior limb would stop the bleeding and he did not notice the further continuous bleeding that was occurring. It could be assumed that alcohol affected the victim's attempt at self-preservation.

The presented case stresses the necessity for discussing with all patients with varicose veins this possibly immediate fatal complication, massive external bleeding. The cause of death could have been easily prevented by correct application of basic first-aid techniques.

## Conclusion

Although severe bleeding from varicose vein rupture is a rare complication, it must be considered as a potential cause of sudden natural death. This case is remarkable from the medicolegal point of view but contains a preventive imperative: saving a human life with varicose vein rupture is only a question of basic first-aid techniques.

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Additional information and reprint requests:
Petr Hejna, M.D.
Institute of Legal Medicine
Charles University
Šimkova 870
Hradec Králové, 500 01
Czech Republic
E-mail: hejnap@lfhk.cuni.cz