

The Histological Changes of the Great Saphenous Vein at 2 Years after Cryosclerosis

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Cryosclerosis was developed at the end of the last decade. It is the endovenous cryoablation of the great saphenous vein and has been forgotten before the era of the endovenous ablation techniques began. The caused histomorphological changes of the vein weren't described before, especially, years after the procedure. A 31-year-old female patient underwent cryosclerosis 2 years ago. Because of the recanalization of the great saphenous vein and recurrent varicosity, high ligation, cryostripping and phlebectomy of varices were performed. During surgery, a saphenous vein piece was harvested to investigate the histomorphological effect of cryosclerosis. Histological findings verified that recanalization had occurred, the vein wall had undergone remodeling, and the picro-sirius red stain showed collagen deposition in the whole vein wall. Cryosclerosis seems to result in the remodeling of the vein wall.

Key Words: Varicose veins, Endovenous ablation, Great saphenous vein, Histological evidences

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INTRODUCTION

For decades, high ligation and saphenous vein stripping with phlebectomy of varices were the gold standard procedures in the treatment of the incompetence of the great saphenous vein (GSV) [1,2]. An alternative method was cryostripping which is less invasive than traditional stripping [3]. Because of the need for minimal invasiveness, the endovenous procedures spread worldwide in the treatment of the incompetence of the saphenous trunks in the last decade [4,5].

At the end of the last century, Milleret and Le Pivert [6] described cryosclerosis as a safe, efficient and feasible endovenous cryoablation technique to treat the incompetence of the GSV. The segmental freezing of the saphenous trunk was performed with a flexible cryoprobe by inguinal approach. In 1987, Le Pivert [7] published the experiences of 350 patients treated by this method. In

1994, Garde [8] concluded that the technique was safe and efficient based on the results of a randomized controlled trial on 800 patients. We have completed a prospective non-randomized trial to compare cryosclerosis and classical stripping, and regarding the short term results, this endovenous procedure seems to be effective. The electron microscopic examination proved that immediate ultrastructural changes were formed in the GSV [9].

CASE

We present the histological changes of the GSV at 2 years after cryoablation. The examined vein piece was harvested from the proximal femoral part of the GSV from a 31-year-old female patient who underwent cryosclerosis 23 months ago. This procedure was performed by inguinal approach, after high ligation a cryoprobe was introduced into the GSV and segmental freezing of the vessel wall was carried

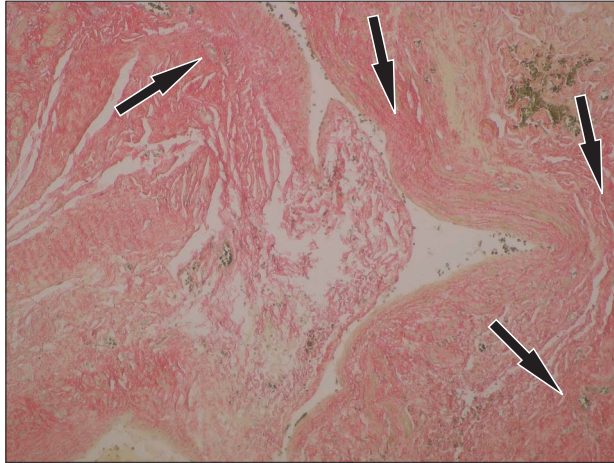


Fig. 1. The photomicroscopic image of the vein piece (picro-sirius red stain, $\times 60$). Arrows mark the collagen in the whole vein wall.

out. The patient was admitted again to our department of surgery because of recurrent varicosity that caused pain and limb swelling at the end of the day. Ultrasonography showed the recanalization of the GSV. Saphenofemoral reflux and an incompetent posteromedial perforating vein were detected as possible reasons. High ligation and cryostripping with phlebectomy of varices were performed under spinal anesthesia. The GSV was very crusted and segmental strictures were found when the cryoprobe was introduced into the vessel lumen. A small vein piece was harvested from the proximal femoral part of the GSV for histological examination. The patient healed without any postoperative complications.

Hematoxylin-eosin, Picro-sirius Red, van Gieson and immunohistochemical stains (CD34, smooth muscle actin) were performed. The anatomical structure of the vein couldn't be recognized microscopically. The wall was collagenized and padded by endothelium that was caused by progressive fibrosis (Fig. 1). The patient consented to this trial and agreed to apply her records.

DISCUSSION

Generally, the role of the endovenous ablation techniques (endovenous laser ablation [EVLA], radiofrequency ablation [RFA], ultrasound guided foam sclerotherapy, mechanochemical ablation, steam ablation) has increased in the treatment of the incompetence of the GSV. These are widely studied, safe and efficient procedures. The most frequently used methods are EVLA and RFA. The long term results are favorable, but the recanalization of the GSV

could be observed some years after the treatment that may cause recurrent varicosity with symptoms [1,2,4,5].

In this short report, the presented method is cryosclerosis, which is the endovenous cryoablation of the GSV. This procedure is not widely known. The reported patient had recurrent varicosity with symptoms. Cryosclerosis was ineffective 2 years after the treatment; however, segmental stenoses of the GSV were observed during the operation. The incompetence of the saphenofemoral junction and the posteromedial perforating vein could cause the recurrent disease. The role of tumescent fluids during cryosclerosis is not clear and it is not routinely used, but it might be useful since by decreasing the volume of the intraluminal blood, vein wall destruction can be achieved more efficiently [10,11]. A prospective trial is necessary to assess the effect of injecting warming liquid around the GSV before cryosclerosis.

The histomorphological effects of the endovenous ablation methods have been previously investigated, mostly from animal experiments [12-14]. Their long term effects have not been described yet. It's typical for all procedures that the vein wall is destroyed by thermal, mechanical or chemical effects [1,4,6,9,10]. Heger et al. [12] summarized in their review on EVLA that the heat induced thrombosis and the thermal damage in the vein wall results in inflammation and activation of the immune system (fibroblast migration). Finally, the vein wall becomes collagenized and results in occlusion or stenosis. The presented histomorphological examination showed that the whole vein treated by cryosclerosis underwent typical remodeling, thus the anatomical structure couldn't be recognized. The wall became crusted because of collagen deposition by fibroblast activity. However, the GSV wasn't occluded yet segmental strictures were observed (Fig. 1).

Cryosclerosis seems to have the same effect as the other familiar endovenous ablation techniques [1,2,4,6-9]. The reason for recanalization of the GSV is not clear, with recurrent incompetence of the saphenofemoral junction and the posteromedial perforating vein being one of the reasons, but it is also possible that the remodeling process of the GSV was not effective enough. The pathogenesis of recanalization after the endovenous procedures and recurrent varicosity has been studied, but more evidence is needed [5].

Considering that this article is only a case report, it has serious limitations. More cases are necessary to assess the real effect of cryosclerosis on the GSV, but the procedure seems to be efficient in obliterative remodeling of the vein.

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