Superficial tributary insufficiency of the giacomini vein causing misinterpretation: A case report with a brief review

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Abstract

Giacomini vein (GV) is an inter-saphenous vein that connects lesser saphenous vein cranially to the greater saphenous vein tracking medial side of the leg. It is aimed to emphasize the importance of the diagnostic evaluation regarding the presence and compatibility of this cranial thigh extension of the lesser saphenous vein before planning the treatment modality in lower limb venous insufficiencies. In this case, an 18-year-old female patient diagnosed as an existence of an insufficient GV and the surgical treatment via extirpation of its small popliteal varicose tributary with isolated insufficiency, is presented.

Introduction

Nearly 130 years ago, an Italian anatomist, a neuroscientist and the professor at the University of Turin, dissected 51 postmortem specimens in order to figure out the route, course and anatomical variations regarding the lower extremity venous system [1]. He was given a special importance to this investigation because it was the first study ever made regarding the variations of lower extremity venous system anatomy. During this cadaveric study in 1873, Carlo Giacomini realized the presence of an intersaphenous communication between greater saphenous vein (GSV) and lesser saphenous vein (LSV), later nomenclature as its inventor’s name; “giacomini vein (GV)” [2]. Carlo Giacomini then published his investigations under the name “observations to serve the study of the venous circulation of the lower limbs [1,3].”

The subsequent investigations regarding the lower extremity venous system anatomy, which are proportional to the progression in the medical technology, including duplex ultrasound (DUS), venography etc. revealed much more over in time. However, the presence and function of the GV are still underestimated and not receive deserved attention in clinical practice and surgical interventions [3].

Case Report

An 18-year-old woman with no previous medical history admitted to the out-patient clinic complaining about a single popliteal varicose vein (Figure 1). She indicated that the varicosity exists for a year or little more and engorges when she stands still and fades when she walks or lies down. Regarding this single isolated varicosity which was otherwise asymptomatic, patient’s primary consideration was seem to be cosmetic. On physical examination of both legs, no other varicosities, telangiectasis or any other signs reminding venous insufficiency were noticed. A single 7 cm long reticular varicose vein, located at the left popliteal region just above the popliteal crease was detected. DUS imaging revealed no safenofemoral junction or safenopopliteal junction insufficiency. GSV and LSV diameters were normal. Thigh and calf perforators showed no reflux. However, DUS imaging revealed the presence of an insufficient GV (reflux >0.5 sec). Anatomically, it was also seen that the varicose reticular vein was a tributary of the GV going downwards to make a connection to Leonardo’s vein (Figure 2). Moreover, reflux in the GV was directed right into this large tributary before it reaches the GV-LSV junction causing the tributary enlarged and varicose. The GV valve just superior to the GV-LSV junction was intact so all
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The reflux tends to drain down into the tributary rather than LSV causing it to become engorged.

The operation was planned on the extirpation of the responsible tributary and ligation of the both ends of it. Under local anesthetic (lidocaine), surgery was performed as planned (Figure 1). Post-operative DUS scan revealed no residual GV reflux.

Discussion

Primarily, the exact anatomical description of the GV has to be made. Considering this, the thigh extension of an LSV may end up different levels, such as the thigh perforators, deep venous system or GSV through the posterior thigh circumflex vein (PTCV). As a description, if a cranial (or thigh) extension of the LSV goes upwards and make a confluence with the GSV via PTCV, it is called GV [4]. The important point is that, all thigh extensions of the LSV are not called GV unless it confluences with PTCV. Otherwise, it is called only the “thigh (or cranial) extension” of the LSV. After the delineation of this terminological nuance, it is seen that the presence of the GV is not rare and the prevalence can be given as 14% of all populations [5]. In contrary, regarding all types of thigh extensions, 2-86.3% of the population with lower extremity varicosities have them [6,7]. Depending on these parameters, it deserves much more attention in case of the lower extremity venous insufficiencies.

In such era in which the Endovenous ablative techniques take over the treatment of venous insufficiencies, detailed anatomical knowledge, and preoperative diagnostic investigations are crucial. Ignoring the influence of the presence of intersaphenous communications may lead to a misdiagnosis and incomplete treatment.

Isolated GV insufficiencies are not rare and treatment with endovenous ablations are frequently applied [5]. Regarding this case, it was first thought to be an isolated GV insufficiency. According to this diagnosis, Endovenous ablation might be considered as a treatment. However, more detailed DUS imaging revealed that the reflux belongs to a tributary rather than the GV itself. A varicose popliteal tributary of the GV with an intact GV-LSV junction caused a siphon effect in the superior portion of the GV so leading downwards leakage mimicking the isolated GV insufficiency. A gentle surgical excision of the responsible tributary and ligation of both ends simply stopped the reflux in the GV as tested with intraoperative and postoperative DUS. What would happen if the exact reason of insufficiency was misinterpreted? The answer is that, an Endovenous radiofrequency ablation or endovenous laser ablation would be performed targeting the GV, causing the obliteration of both the GV itself and subsequent shrinkage of the varicose tributary. This shrinkage of the varicosity would be achieved by stopping the downward reflux from GV into the tributary. However, this misdiagnosis would lead to an aggressive approach so resulting in unnecessarily more complicated and more expensive operation. Additionally, needless ablation of the GV, would result in the loss of a potential conduit used for infrainguinal arterial reconstructions [8].

Another different anatomical entity related to this situation is that the presence of a non-saphenous vein of the popliteal fossa. Moderate tortuosity located at the posterior aspect of the knee and the upper calf which has no relationship with GSV or LSV called popliteal fossa vein (PFV) [8]. Prevalence of the PFV is 4.4%. The PFV perforates the deep popliteal fascia and confluences the popliteal vein above the LSV [9]. In the presented case, the presence of a PFV is also excluded with preoperative DUS examination.
**Conclusion**

As a vascular surgeon, lower extremity venous anatomy, and its variations should be well-known and well assessed carefully before deciding the operational strategy. Pre-operative DUS examination plays an important role in doing this.

**References**


