

# Unilateral Duplication of Great Saphenous Vein in the Leg – A Cadaveric Case Report

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**Abstract:** Duplication of great saphenous vein in the left leg of 62 year-old male cadaver was observed during routine dissection of the lower limb at the Department of Human Anatomy, Universiti Putra Malaysia. The duplication of the great saphenous vein in the left leg was associated with oedematous leg and foot. Furthermore, there was also anterolateral overlapping of the femoral artery over the femoral vein at its beginning in the femoral triangle. This variation is very important to a surgeon who is dealing with coronary artery bypass surgery, awareness in present of recurrence of varicosity after a successful surgery and awareness for vascular radiologist in doing ultrasonography of great saphenous vein and preparing for femoral nerve block.

**Keywords:** anatomical variant, great saphenous vein, femoral artery, femoral vein.

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## 1. INTRODUCTION

The great saphenous vein (GSV) is also known as long or internal vein [1] is a superficial large venous vessel which runs near the inner surface of the leg from the ankle to the thigh. In basic practise, this vein forms from the dorsal venous arch at the dorsum of foot and later empties into the femoral vein after traverses the saphenous opening of the fascia lata. From the foot, it travels through the behind of knee area and ascends through the femoral triangle that is formed by two muscles and a ligament. Before entering the femoral vein, it received venous blood from several veins, including the superficial gastric, superficial circumflex iliac and superficial pudendal. The main function of the great saphenous vein is delivered of venous blood from ankle, lower leg and thigh to the femoral vein. Along its length there are about 10 to 12 valves that prevent the blood from flowing back toward the foot. Varicose veins occur when one or more valves are incompetence and later creating distended areas where blood flow backward into smaller veins just under the surface of skin. The great saphenous vein is sometimes stripped out of the leg to eliminate varicose veins [2] and it is always selected as the source of grafts for surgical coronary bypass [3] due to its size and superficial location.

## 2. MATERIALS AND METHODS

During dissection of the lower limbs for undergraduates at the Department of Human Anatomy, Universiti Putra Malaysia, there was unilateral an anomalous pattern of loop type duplication of great saphenous vein (GSV) was observed from middle of calf up to the knee region (Figure 1). The formation and course of the GSV were as usual on the both legs. However, on the left side, GSV was dilated and it was also associated with swollen tissue and oedematous surroundings (Figure 2). We also found that femoral vein (FV) was overlapped by the femoral artery (FA) within the femoral sheath at the femoral triangle (Figure 3). The FA overlapped anterolaterally above the FV instead of artery and vein are running parallel or side by side, where the FA might be lateral to FV.

### 3. DISCUSSION

The venous system is more variable compared to the arterial system due to its anatomic variations [1]. A good understanding of the venous anatomy is important for the surgeons, radiologists and sonographers. The true variation is rare (1%), there are many variation of GSV in the thigh, at the knee and in the leg [1]. In this case study, duplication of the GSV in the leg is less common than duplication of the GSV in the thigh. A study by Veverkova *et al.* [4] has reported that there are lack of study or literature regarding GSV is proven a small range from 1% - 20% of duplication of GSV. As most of surgery is commonly used for coronary arterial bypass, eventually by its features of easy accessible, enough distance between tributaries and the perforating veins so that usable length can be harvested and its wall contains a higher percentage of muscular and elastic fibers than other superficial veins. Furthermore, Tothonglor *et al.* [5] reported that beside the unclear of anatomical knowledge on GSV, it will cause the complication of varicose vein. They also mentioned regarding the injury of the saphenous nerve after ankle surgery, trauma of sartorial branch due to arthroscopic portal placement [6], blockage of the nerve and combined with others nerves for ankle and foot surgery [7]. In the knowledge of the duplication below the knee in the case, might give the awareness in performing the above procedures. In venous and arterial anomalies of lower limbs with duplex scanning for diagnostic approach or clinical implication, a missed duplication of GSV is giving a potential reason regarding the recurrence of varicosity even though the surgery was successful [8]. Furthermore, beside from the duplication of GSV, from this dissection also observed that the anatomical relation between the femoral artery and vein in the femoral triangle is different in two legs. On the right side, the femoral vessels are arranged parallel where artery is lateral to vein, same as mentioned in the most anatomy textbook. However, on the left side the femoral artery lies anterolaterally or overlapping to the femoral vein. That impingement of femoral artery on the femoral vein in the groin or at their origin in the femoral triangle might cause dilation of GSV and inflammation and oedema of the left leg and foot.

#### Statement of Interests:

The authors declare that there is no conflict of interest regarding the publication of this paper.

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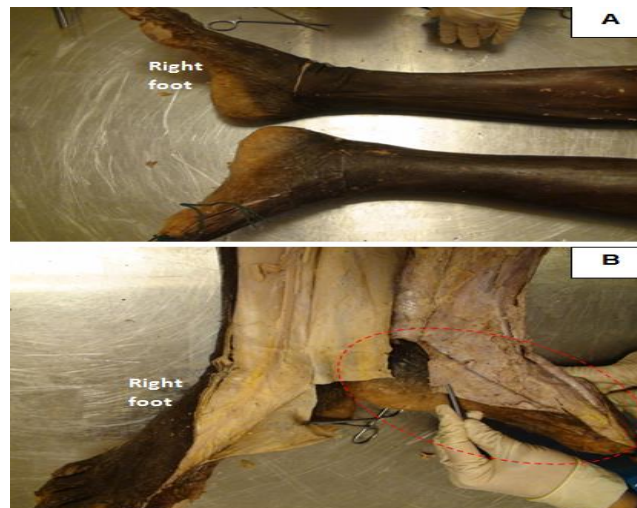
APPENDIX - A

Figure 1:



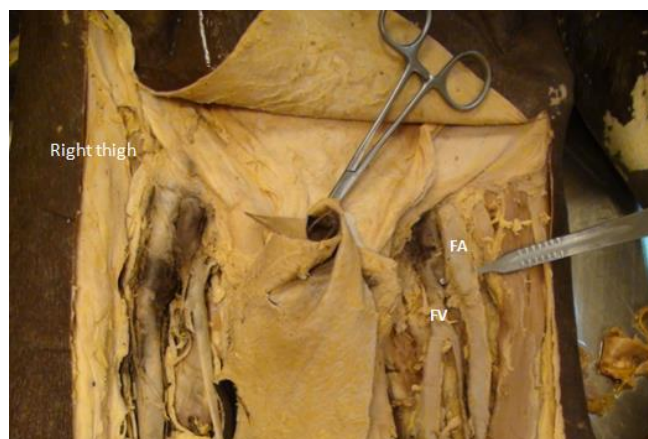
Photograph shows duplication of great saphenous vein (solid white arrow) at the left leg and it looked like a loop. These veins later are joined (dotted white arrow) at the distal part of leg.

Figure 2.:



Photograph shows the left foot and lower part of the leg were swollen due to oedematous as compare to the right foot (normal condition). A. The foot before dissect, B. The foot after dissect.

Figure 3:



Photograph shows the overlapping of femoral artery on the femoral vein at the femoral triangle. This caused a reduction amount of venous blood drained into the upper part of thigh and lead to formation of oedematous on the lower leg and foot. (Abbreviation: FA – femoral artery; FV – femoral vein).