How to do it
Minimal-invasive, video-assisted vein harvesting for cardiac and vascular surgical procedures

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Abstract

Harvesting of the saphenous vein is a routine procedure in coronary and peripheral vascular surgery. It is usually performed using a continuous long skin incision. Minor complications are reported in up to 24% (hematoma, wound dehiscence, infection, pain) and major problems necessitating surgical interventions (bleeding, abscess) in less than 1%. These complications lead to a prolonged hospital stay. To reduce these complications we have used a new endoscopic, video-assisted technique in 17 patients. Harvesting of the total length of the saphenous vein is possible with only one 2–3 cm long incision proximally the knee joint. We conclude that this technique is safe, may reduce the morbidity of saphenous vein harvesting and is associated with a perfect cosmetic result. © 1997 Elsevier Science B.V.

Keywords: Autologous vein harvesting; Endoscopic; Minimally invasive

1. Introduction

Despite all efforts to find alternative bypass material, the autologous vein is, beside the arterial grafts, the most suitable bypass material in coronary and peripheral vascular surgery [1]. Usually the long saphenous vein is prepared and taken by a continuous incision through the skin [1–4]. Even if severe wound complications are rare (1–3%), the percentage of impaired wound healing ranges between 24 [5] and 44% [4]. In the 1990s efforts were made to use the Mayo-Stripper [6] for harvesting veins for coronary and peripheral vascular surgery. Lumsden [2,6] published a method to harvest the saphenous vein subcutaneously with videoassistance for vascular surgery. We are using an especially developed endoscopic instrumentarium (Endoscopic vein harvest tray, TTVO1, Ethicon Endo Surgery) for harvesting the saphenous vein in the thigh and lower leg (Fig. 1). With our technique we are able to harvest the total length of the saphenous vein under endoscopic control through only one 2–3 cm skin incision proximal to the knee joint.

2. Patients and methods

Endoscopic subcutaneously saphenous vein harvesting was performed in 17 patients who underwent coronary artery bypass surgery.

The patient is placed in supine position on the operation table. After the usual preparation of the operation area a 3 cm transverse skin incision above the medial knee joint is performed and the vein is prepared. An endoscope (30° Olympus; Olympus 3 chip camera (OTV-S2); light source (Olympus CLV U-20); 19 inch monitor) is inserted in the endopath subceu-dissector (SVSD1, Ethicon Endo-surgery). Under endoscopic
control the dissector is introduced through the small skin incision and is moved gently forward through the subcutaneous tissue right above the saphenous vein towards the groin (Fig. 2). The front part of the dissector creates and holds up a cavity that can be completely visualised. During this procedure sidebranches of the vein can be identified (Fig. 3). As soon as the groin region is reached the dissector is removed. The endoscope is removed and is inserted in the subcu-retractor (SVSR1, Ethicon Endo-Surgery). Now the subcu-retractor gets inserted in the preformed channel. With a vessel-dissector (SVVD1, Ethicon Endo-surgery) the vein gets relieved from the subcutaneous tissue. Sidebranches of the vein are clipped (Ligaclip allport, Ethicon Endo-surgery) or cauterised far away of the main vein using the isolated endo scissor (DCS12, Metzennbaum-Scissors, Ethicon Endo-surgery) before they are cut. If the visualisation gets blurred by blood the whole retractor or sometimes only the endoscope is drawn back for clearing. By using the dissector, the scissors and the clipapplier the vein can be mobilised over the whole length of the created tunnel. The same technique is used to release the vein in the lower leg. If the vein is mobilised over the length that is needed, the saphenous vein gets clipped and cut at it’s most peripheral part. A preformed ligation-sling (Ethicon Endo-Surgery) is wrapped around the vein and is slid under optic control over the vein towards the groin using the subcu-retractor. If the most distal part is reached the sling is closed and the vein and the suture are cut. The vein in its total length can be removed, sidebranches can be clipped and the vein is stored in heparinised saline with papaverine until used for bypass surgery. A small redon drainage is applied in the small cavity of the thigh and the small skin incision is closed subcutaneously and intracutaneously with selfresolving sutures. The leg gets wrapped with an elastic bandage for 24 h (Fig. 4).

3. Results

The mean harvesting time was 45 min. Through a 3 cm incision we usually harvested a 55 cm long saphe-
nous vein. No severe complications occurred. Mild subcutaneous hematoma without leg induration appeared in 4 patients that resolved completely within a few days. In one case serous wound drainage could be noted for 3 days. All patients could be mobilised quickly. In 1 patient the endoscopic harvesting was changed to the open technique in the lower leg due to severe skin adhesions of the vein. Preliminary histological studies showed no injury of the vein and a preserved structure.

4. Discussion

Harvesting the saphenous vein is one of the most frequent operations [2]. It is harvested in 98% in the coronary artery bypass surgery [2,4] and is also the most suitable graft in peripheral bypass surgery. The incidence of impaired healing is described as high as 24–44% [4,5]. Exact data of prolonged hospital stay caused by wound healing complications after vein harvesting are poorly documented. Compared with impaired wound healing of skin incision caused by sternotomy the incidence of impaired wound healing in leg wound is 99 times higher [5]. Using a long continuous incision is still the standard technique for saphenous vein harvesting [1–4]. Descriptions of minimal invasive techniques using an external Mayo stripper have been reported [1,3]. They are not widely accepted because there is no visual control and vein damage is possible. Lumpsen first described a video-assisted subcutaneously harvesting of the saphenous vein for peripheral bypass surgery [2,5]. He used three 4 cm incisions for the vein harvesting (harvesting time 11/2 h). With the new technique using only one 2–3 cm skin incision we have achieved perfect cosmetic results, reduced postoperative pain and improved mobilisation. The described endoscopic, video-assisted technique may evolve as a superior technique to the conventional open procedure. If the new method will be associated with a significantly reduced morbidity, a preserved endothelial structure and function of the vein will be assessed in a prospective randomised study.

References