



Direct lymphangiography as treatment option of lymphatic leakage: Indications, outcomes and role in patient's management



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ABSTRACT

Background: To evaluate the effectiveness of lymphography as a minimally invasive treatment option of lymphatic leakage in terms of local control and to investigate which parameters influence the success rate.

Method: This retrospective study protocol was approved by the ethic committee. Patient history, imaging data, therapeutic options and follow-up were recorded and retrospectively analyzed. Between June 1998 and February 2013, 71 patients (m:w = 42:29, mean age, 52.4; range 42–75 years) with lymphatic leakage in form of lymphatic fistulas ($n = 37$), lymphocele ($n = 11$), chylothorax ($n = 13$) and chylous ascites ($n = 10$) underwent lymphography. Sixty-four patients (90.1%) underwent successful lymphography while lymphography failed in 7 cases. Therapeutic success was evaluated and correlated to the volume of lymphatic leakage and to the volume of the applied iodized oil.

Result: Signs of leakage or contrast extravasation were directly detected in 64 patients. Of 64 patients, 45 patients (70.3%) were treated and cured after lymphography. Based on the lymphography findings, 19 patients (29.7%) underwent surgical intervention with a completely occlusion of lymphatic leakage. The lymphatic leak could be completely occluded in 96.8% of patients when the lymphatic drainage volume was less than 200 mL/day ($n = 33$). Even when lymphatic drainage was higher than 200 mL/day ($n = 31$), therapeutic lymphography was still successful in 58.1% of the patients.

Conclusion: Lymphography is an effective, minimally invasive method in the detection and treatment of lymphatic leakage. The volume of lymphatic drainage per day is a significant predictor of the therapeutic success rate.

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1. Introduction

Directly lymphography can visualize and prove the lymphatic origin of a detected fluid collection as seen in chylascos, lymphocele, chylothorax or lymphatic fistula in the postoperative or posttraumatic patient [1,2]. With the help of diagnostic lymphography, allocation of lymphatic fistula is possible because the lymphatic vessels are difficult to visualize intraoperatively due to the small size and the perioperative sobriety [3]. Initial therapy favors conservative measures including drainage, total parenteral

nutrition and pressure dressings. Nevertheless, such measures may sometimes take several weeks to control lymphatic leakage and may therefore lead to prolonged hospitalization. Surgical options are recommended if conservative therapy fails. However, surgical reinterventions are associated with a significantly higher morbidity. Using iodized oil for lymphography as contrast agent, this substance has the potential to induce granulomatous reactions when extravasating [4,5] which may be further assisted by additive conservative measures [6–9].

To our knowledge, experience with lymphography as a treatment option for lymphatic leakage is rare. In addition, the number of patients investigated in the existing studies was relatively small.

The intention of our study was to demonstrate the therapeutic impact of lymphography on the postoperative patient with known

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lymphatic leakage refractory to conservative therapy in a large patient population ($n=64$).

2. Methods

2.1. Patient population

Between June 1998 and February 2013, 71 patients (29 women, 42 men, mean age, 52.4 years; age range 42–75 years) with lymphatic leakage underwent direct lymphography (47 monopodal, 24 bipedal). Sixty-four patients (90.1%) underwent successful lymphography while lymphography failed in the other 7 cases. The lymphatic leakage presented in form of lymphatic fistulas ($n=37$), lymphocele ($n=11$), chylothorax ($n=13$), or chylous ascites ($n=10$). The reasons for lymphatic leakage were as follows: prior inguinal lymphadenectomy for cutaneous malignant melanoma (47.9%, $n=34$) or for Merkel cell carcinoma (4.2%, $n=3$), pelvic lymphadenectomy for ovarian cancer (2.8%, $n=2$), renal transplantation (14.2%, $n=10$), radical prostatectomy (9.8%, $n=7$), cystectomy (2.8%, $n=2$), splenectomy (1.4%, $n=1$), oesophagectomy (9.8%, $n=7$), and gastrectomy (7.1%, $n=5$).

The study protocol was approved by the local ethical committee. All lymphography procedures were performed with the written informed consent of the patient and in the absence of contraindications. The indication for lymphography was persisting lymphatic leakage, which was unlikely to be cured by conservative treatment only. Lymphography was performed if the lymphatic leakage has persisted for longer than 3 weeks. In cases of chylothorax or chylous ascites, lymphography was performed using a bipedal approach with evaluation of the thoracic duct. In cases of lymphatic fistula and lymphocele, monopodal lymphography was performed with identification of the pori of lymphatic vessels of the inguinal region or pelvis.

2.2. Lymphography procedure

After cutaneous disinfection of the feet (Kodan[®], Schülke & Mayr GmbH, Norderstedt, Germany), we injected a mixture of 2 ml of mepivacainhydrochlorid (Scandicaine[®] 1%, Astra Zeneca GmbH, Wedel, Germany) and 2 ml of methylene blue dye (Patentblau V, Guerbet GmbH, Sulzbach, Germany) into the subcutaneous tissues of the first to the third interdigital spaces. After sufficient coloration of pedal lymphatic vessels, the patient was placed on

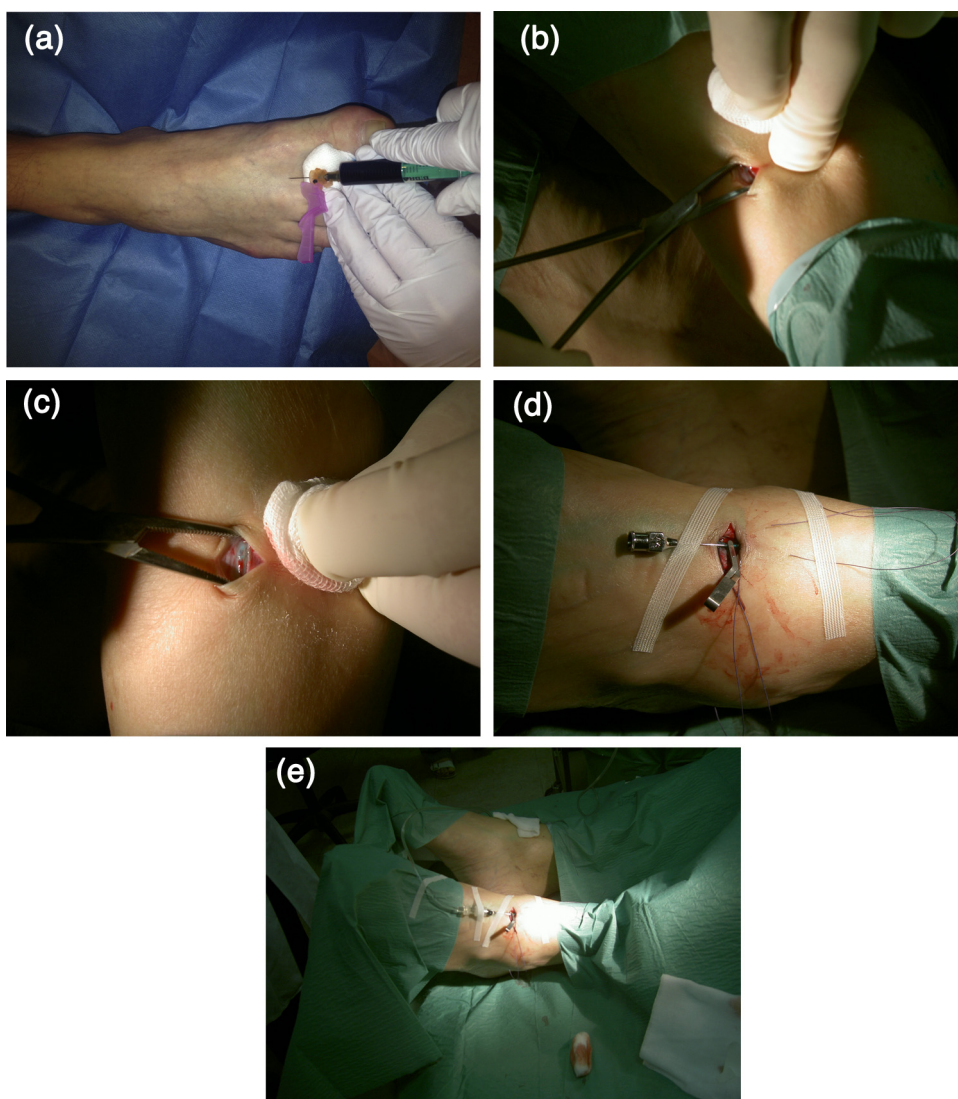


Fig. 1. Lymphography procedure. (a) After injection of a mixture of mepivacainhydrochlorid and methylene blue dye and sterile covering of the feet, a longitudinal cutaneous incision metatarsal near the ankle is exposed. (b) The best lymphatic vessel is found and prepared. (c) The lymphatic vessel is cannulated with the special needle (with spring and mandarin). The needle is then fixed with adhesive stripes. (d) The lymphatic vessel is ready for the injection of iodized oil. Needle and infusion line are connected and fixed with adhesive stripes.

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