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Tegtmeyer

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[54] **LYMPH DUCT CANNULATOR AND METHOD**

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[52] **U.S. Cl.**..... **128/2 A;** 128/DIG. 26; 128/214 R

[51] **Int. Cl.²**..... **A61B 6/00**

[58] **Field of Search**.... 128/2 A, 346, 334 R, 334 C, 128/215, 214 R, DIG. 26

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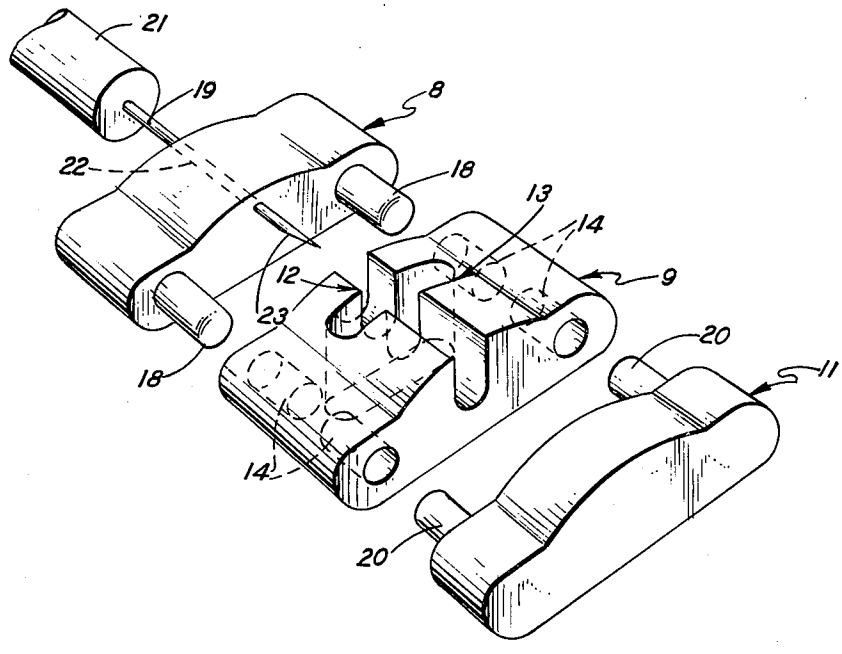
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[57] **ABSTRACT**

This invention is directed to a product for and method of lymph duct cannulation which includes surgical isolation of a lymph duct, placing the duct in a groove of a lymph duct holder, occluding the duct adjacent and proximal to the holder, distending and dilating the duct by milking same toward the cannulator from a point distal thereto until the duct fills the groove, aligning a needle inserter adjacent and distal to the holder having a channel that aligns with said groove and fixes the duct securely in said groove, and inserting the needle through the inserter channel into the duct within the groove. The groove is provided with an ovoid slot through which a ligature may be placed around the duct and tightened to hold the needle in place. The occluder is then loosened and radiopaque material injected through the needle into the duct.

15 Claims, 3 Drawing Figures



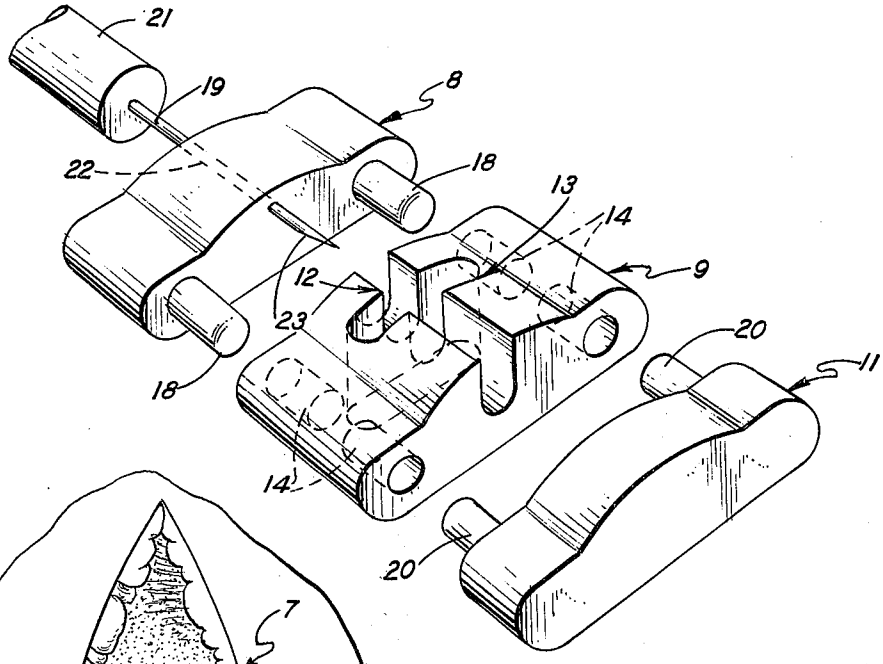


FIG. 1

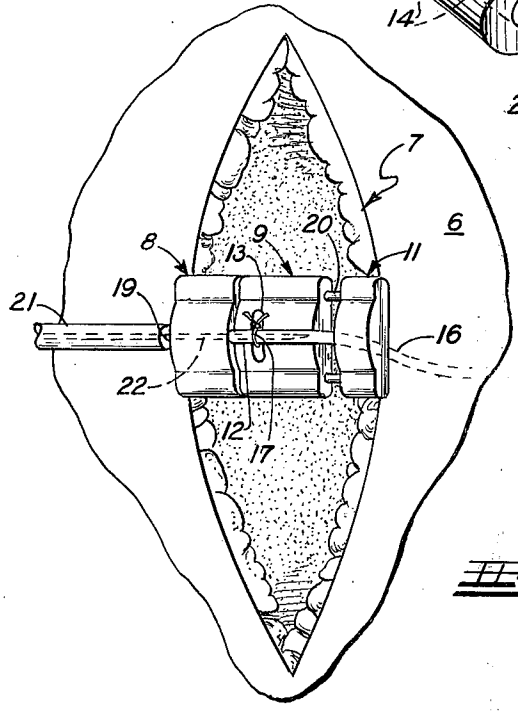


FIG. 2

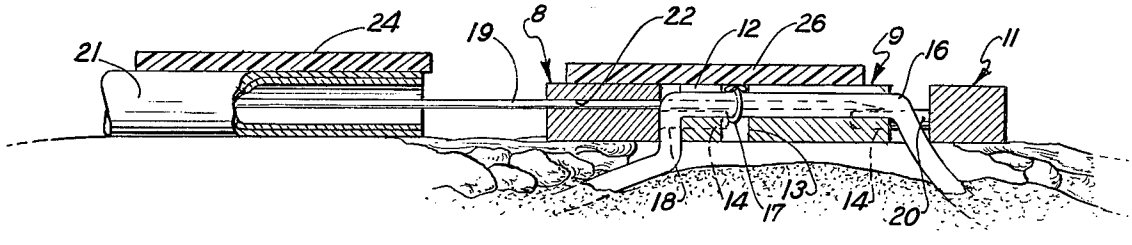


FIG. 3

LYMPH DUCT CANNULATOR AND METHOD

BACKGROUND - FIELD OF THE INVENTION

This invention relates to the medical arts and particularly the insertion of a needle or cannula in small flaccid vessels such as a lymph duct for inserting diagnostic or treating fluids such as radiopaque medium or withdrawing fluid samples for examination. The described procedure uses a lymph duct holder and cooperative elements to occlude, and guide a needle into, the duct which is securely fixed in the holder.

BACKGROUND - DESCRIPTION OF PRIOR ART

Lymphangiography has become an important diagnostic and therapeutic modality since its introduction by Kinmonth, Taylor and Harper in 1955, as reported in 1 British Medical Journal 940. Locating and cannulating a suitable lymph vessel remain difficult, however, even for those with keen eyes and sure hands, as reported in American Journal of Roentgenology, Radium Therapy and Nuclear Medicine, Vol. 96, p.1053 (1966); Vol. 98, p.948 (1966); Vol. 101, p.978 (1967); Vol. 107, p.877 (1969); and Vol. 114, p.830 (1972) and Radiology, Vol. 86, p.934 (1966); Vol. 88, p.576 (1967) and Vol. 101, p.699 (1971).

SUMMARY OF THE INVENTION

This invention relates generally to new and useful improvements in procedure and device for cannulation of small animal vessels and particularly seeks to provide a grooved lymph duct holder and a slidably cooperative aligned needle holder to direct a needle into the lymph duct held in the groove with means to occlude the duct, preferably a slidably cooperative aligned occluder at the opposite end of the holder.

OBJECTS OF THE INVENTION

Therefore, an object of this invention is to provide a simplified procedure and device to insert a cannula into lymph ducts and similar small flaccid vessels.

It is also an object to provide a grooved holder, an occluder slidably aligned at one end thereof and an inserter slidably aligned at the opposite end of said holder whereby a needle can be easily introduced into a small flaccid vessel and fixed in that position if desired.

It is a further object to provide a procedure and device whereby lymph duct is dilated, then occluded and finally held in a fixed position for insertion of the cannula at a general perpendicular angle to the fixed stretched wall of the duct.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. **1** is a perspective exploded view of the cannulator device and needle as designed in accordance with this invention;

FIG. **2** is a perspective view of the device mounted on a patent's foot after insertion of the needle and displacement of the occluder; and

FIG. **3** is a vertical section taken along line **3—3** of FIG. **2** but after tape strips are in place.

DESCRIPTION OF THE PREFERRED EMBODIMENT

The localization of the lymph vessel is a modification of the technique of Kinmonth et al mentioned hereinbefore. 0–5 ml. of a solution of Evans Blue dye mixed

in a 1:1 ratio with 1 per cent lidocaine hydrochloride is injected introdermally and subcutaneously into each of the three web spaces between the first and fourth toes. After 10 minutes the dye-carrying lymphatics are easily identified. The same procedure is applicable to the hands.

A flat area on the dorsum of the foot **6** is chosen for a transverse or vertical skin incision **7** to allow for the stable placement of the lymph duct cannulator. It is important to thoroughly isolate the duct by meticulously removing all the surrounding tissue and to keep the lymph duct moist with saline so that it can be adequately distended.

The cannulator consists of three basic parts as will be seen most easily in FIG. **1,** namely the needle inserter **8,** the lymph duct holder **9,** and the lymph duct occluder **11.** All three sections have a rounded superior surface and a flat inferior surface as a convenience for the physician to determine the respective surfaces by touch. Holder **9** is provided with a pair of bores **14,14** at each end, an elongated groove **12,** which is enlarged intermediate the ends to form an ovoid slot **13** shown closer to the distal end. When positioning the lymph duct holder it is desirable that the ovoid slot used for the silk ligature be closest to the toes, i.e., distal. The longer segment of the groove for the lymph duct is then cephalad, i.e., proximal where it can be utilized.

After a lymph duct segment **16** one to three centimeters preferably, or other adequate length has been isolated, a loop of 4–0 silk **17** is placed around the vessel. The duct is then placed in the groove **12** of the holder **9.** The silk is positioned in the ovoid slot **13** provided in the holder and a loose overhand knot tied therein. It is desirable but not essential that the ovoid slot be used in conjunction with the ligature. The lymph duct occluder **11** is then slid into place by inserting pins **20,20** into associated proximal bores **14,14** to completely occlude the vessel proximally. The occluder shown has been found desirable but is not necessary as a ligature could be used to occlude the duct. Pins **18,20** and bores **14** insure the proper alignment of the holder **9** with both the inserter **8** and occluder **11.** Obviously the positions of bores and pins could be reversed or other equivalent mechanical means could be used to insure such alignment, e.g., by cooperatively recessing and offsetting the respective elements.

The duct **16** is now distended by distally massaging the skin over the duct toward the incision. This milks the lymph cephalad, dilating the duct **16** until it fills the groove **12** in the holder. The needle inserter **8** is then slid into place by inserting pins **18,18** into associated distal bores **14,14.** Now the duct **16** is fully distended and held in position, proximally by the occluder **11** and distally by the needle inserter **8.**

A **27** or **30** gauge lymphangiographic needle **19** is attached by the connecting tubing **21** to a saline-filled syringe (not shown). A loop of the tubing is taped to the patient's skin. The needle is gently advanced through the channel **22** in the needle inserter introducing the needle into the lumen of the duct. The bevel **23** of the needle may be rotated to facilitate its placement in the duct. The needle and associated channel sizes are such that there is little play so that the insertion into the duct will be at a fixed angle. A small amount of saline is injected to further dilate the duct. The needle **19** is then advanced past the ovoid slot holding the silk. The needle length is such as to prevent the advancement of its point beyond the end of the holder. The silk ligature

17 is then tightened around the duct and the needle in a single overhand knot and the excess trimmed.

A strip of sterile tape **26** is placed over the cannulator assemblage and fastened to the skin. Another strip **24** is placed over the needle fastening the needle to the skin to prevent recoil of the needle. The occluder **11** is loosened or removed and Ethiodol, (trademark of Fougera & Co. for a radiopaque liquid of the ethyl ester of the iodized fatty acids of poppy-seed oil) is infused into the vessel. It is desirable to leave a tiny air bubble in the line to ascertain the passage position of the oil. Occasionally there is slight oil leakage from the needle **19** after the duct **16** has been cannulated. If the needle (which is easily seen in the groove) appears to be properly situated, it is best to leave the needle in place. Sufficient oil can be injected despite a small loss. Once a suitable duct has been isolated, the needle need only be placed in the inserter **8**, which directs it into the lymph vessel and holds the needle firmly in place, preventing it from being inadvertently removed while the Ethiodol is injected. After injection, the patient is ready for radiology.

I claim:

1. A small isolated vessel cannulator comprising

A. a rectangular vessel holder having proximal and distal end(s) surfaces, an open groove extending between said holder end(s) surfaces, and appropriately sized to receive and permit distension of said isolated vessel,

B. a rectangular needle inserter having proximal and distal end(s) surfaces, and a channel extending between said inserter end(s) surfaces and appropriately sized to permit a needle to pass therethrough without play.

and first means (to) slidably (secure) securing in a fixed position said inserter to said holder with said channel and said groove being in continuous longitudinal alignment and with one of said proximal end surfaces having facing contact with one of said distal end surfaces.

2. The cannulator of claim **1** wherein said groove is enlarged intermediate said holder ends by an ovoid slot.

3. The cannulator of claim **2** wherein said ovoid slot is located closer said distal than said proximal holder end

4. The cannulator of claim **3** wherein said inserter is slidably secured at said distal holder end.

5. The cannulator of claim **1** wherein said first means is a plurality of aligned associated pins and bores connecting between said holder and said inserter.

6. The cannulator of claim **1** additionally comprising

C. an occluder having proximal and distal end surfaces, and second means slidably securing in a fixed position said occluder to said holder at the holder end opposed to said inserter whereby any duct within said groove will be occluded.

7. The cannulator of claim **6** wherein said inserter is slidably secured at said distal holder end.

8. The cannulator of claim **7** wherein each of said means is a plurality of aligned associated pins and bores connecting between said holder and respectively said occluder and said inserter.

9. The method of cannulating a small continuous vessel segment in situ in an animal body comprising isolating said vessel segment by removing any surrounding tissue between proximal and distal ends thereof, resting a grooved vessel holder on said body at said isolation site, placing a portion of said isolated segment in said groove, occluding said isolated segment near one of said ends beyond said groove, distending said portion in said groove by milking said vessel beyond said other end toward said occluded end, fixing said portion in said groove, bringing a needle into longitudinal alignment with said groove near said other end, and inserting (a) said needle (in) into said portion (from near said other end into) within said groove.

10. The method of claim **9** wherein said vessel is a lymph duct.

11. The method of claim **10** wherein said portion is fixed in said groove by a needle inserter having a channel in alignment with said groove and said needle is inserted in said portion through said channel.

12. The method of claim **11** wherein said inserter is slidably mounted on said holder at said other end.

13. The method of claim **12** wherein said one end is proximal and said other end is distal.

14. The method of claim **10** wherein said isolated segment is occluded by an occluder slidably mounted on said holder at said one end.

15. The method of cannulating a continuous lymph duct segment in situ in an animal body comprising isolating said duct segment by removing any surrounding tissue between proximal and distal ends thereof, placing a ligature around said duct segment, resting a slotted-grooved duct holder on a said body at said isolation site, placing a portion of said isolated segment in said groove, arranging said ligature in said slot, occluding said isolated segment near one of said ends beyond said groove, distending said portion in said groove by milking said vessel beyond said other end toward said occluded end, fixing said portion in said groove, bringing a needle into longitudinal alignment with said groove near said other end, inserting said needle into said portion within said groove past said slot, and securing said ligature around said needle and said segment.

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