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[56]

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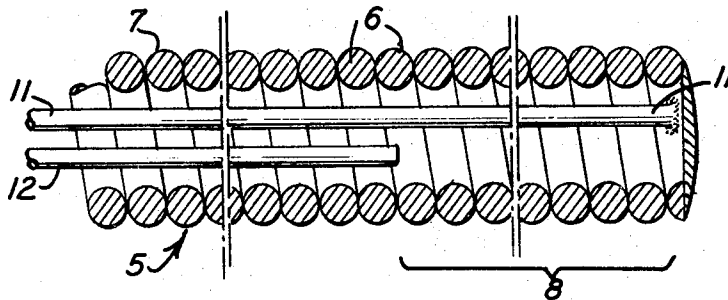
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[54] FLEXIBLE SPRING GUIDE TIP FOR INSERTION
OF VASCULAR CATHETERS
3 Claims, 2 Drawing Figs.

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A61m 23/00
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ABSTRACT: A spring guide for use in connection with the insertion of cardiac or vascular catheters having internal reinforcement throughout its length, the reinforcing means having reduced stiffening effect within the distal tip to provide relatively greater flexibility of the guide in the tip portion thereof.



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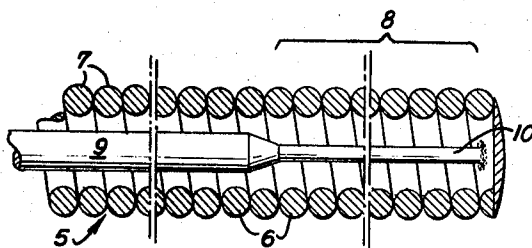


Fig. 1

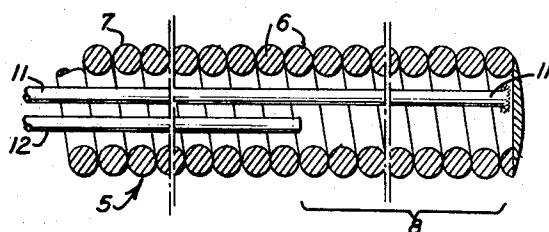


Fig. 2

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FLEXIBLE SPRING GUIDE TIP FOR INSERTION OF VASCULAR CATHETERS

This invention relates to new and useful improvements in spring guides used primarily in vascular manipulations and more particularly seeks to provide a spring guide that has reinforced strength throughout the proximal portion but flexibility within the distal tip.

The marked advances in cardiac and vascular surgery in the past few years and other medical problems that require diagnostic study of the vascular beds and systems has led to the extensive use of cardiac or vascular catheters, particularly for retrograde aortography and angiocardiology, and less often to take blood samples, determine oxygen content, infuse medicaments, etc. at internal sites and various other uses that require the insertion of a relatively long catheter to an internal site that requires movement of the catheter into branch vessels at sharp angles relative to the feeding direction of the catheter.

The most common method for insertion of such catheters is the percutaneous technique described in 1953 by Sven Ivar Seldinger. In this procedure a local anaesthesia is administered and a skin puncture made at a small angle to the vessel (e.g. femoral in the leg or brachial in the arm) with an obturator positioned within a cannula. Once the unit has been properly located in the vessel, the obturator is removed and the flexible spring guide then inserted through the cannula into the vessel for a short distance. Pressure is then applied to hold the spring guide in place while the cannula is withdrawn. The spring guide is then fed into the vessel generally under the fluoroscope until the desired point is reached which may or may not require considerable manipulation if there are branched vessels or curves concerned. Thereafter the catheter is passed over the flexible spring guide and fed into the desired position and the spring guide then withdrawn from the catheter unless both are needed for cooperative manipulation purposes.

There are presently available spring guides made from stainless steel having outside diameter sizes from about 0.025" (pediatric), up to 0.054" and from about 100 to 150 cm. long which are used with correspondingly shorter catheters. The guides consist of an outer case which is a closely wound stainless steel spring to form a continuous coil surrounding an inner bore which is then sealed at the distal end with a rounded tip or cap. A straight core wire is placed within the coil bore and is either freely movable within the guide or fixed within the guide about 3 cm. short of the distal tip which is left flexible for manipulation purposes.

Thus the distal tip has the consistency of the proximal portion or complete lack of reinforcement. In some instances, an 0.014 wire has been braided over with a finer wire with the braid passing about 3 cm. beyond the primary wire and the entire unit placed within the spring guide and secured at both ends within the braided extension being with the tip portion of the spring guide. This is obviously complex and expensive, and in any event, cannot be accomplished in smaller sizes such as 0.035 or 0.0025 O.D.

Therefore, it is an object of this invention to provide a spring guide, the distal end of which has flexibility and strength intermediate to that of the proximal body portion of the spring guide.

We have found the wire diameter of the reinforcing core wire can be reduced in the distal tip relative to that in the

proximal body portion to satisfactorily accomplish the above object.

With the above and other objects and features in view, the nature of which will be more apparent, the invention will be more fully understood by reference to the drawings, the accompanying detailed description and the appended claims.

In the drawings:

FIG. 1 is a longitudinal cross-section taken through a spring guide constructed in accordance with this invention; and

FIG. 2 is a similar longitudinal cross-section through a modified spring guide.

This invention as illustrated shows two modifications of spring guides constructed in accordance with this invention but obviously others will fall within the scope thereof.

A conventional spring guide 5 is shown in FIGS. 1 and 2 made up of continuous contiguous coil 6 with a proximal portion 7 and a distal tip 8. These represent .035 O.D. spring guides, but the same principle is applicable to smaller sizes or larger sizes that may be made. As shown in FIG. 1 the inner core wire has two portions, the proximal heavy portion 9 and the distal lighter portion 10 which coincides with the distal tip of the spring guide. Portion 9 is about .014" and portion 10 is about .010".

As shown in FIG. 2 there are two core wires, wire 11 being approximately .006" and extending throughout the entire length of the spring guide and wire 12 being about .010" but extending only up to the beginning of the distal tip 8 of the spring guide. All three of the inner wires disclosed herein are fixed at the proximal end of the spring guide and wires 10 and 11 are fixed at the distal end thereof, whereas wire 12 is fixed at the proximal end of the distal tip. Thus in both modifications there is provided an intermediate reinforcement and flexibility of the distal tip of the spring guide.

In the examples shown, both the spring guides and the inner core wires are stainless steel but the same principles are obviously applicable to any of the various materials from which a spring guide may be made.

Various changes, modifications and ramifications will, of course, be obvious to those skilled in the art and are considered to be within the scope of the appended claims hereto.

We claim:

1. A coil spring guide comprising an elongated coil spring having a proximal portion, a flexible distal tip portion and a wire core extending throughout the entire length of both said portions and fixed at the respective ends of said spring guide, said wire core having a reduced cross-section within said distal tip portion and consisting of a first wire within said proximal portion and a second wire within said proximal portion and said distal tip.

2. The spring guide of claim 1 wherein said first wire is about 0.010" and said second wire is about 0.006".

3. A coil spring guide for use during percutaneous catheterization of body vessels comprising an elongated, tubular coil spring with opposite ends having a proximal portion, a flexible distal tip portion and reinforcing core means within said spring coil extending throughout the entire length of both said portions and fixed at the opposite ends thereof, said reinforcing core means consisting of a first wire member extending the full length of the coil spring guide and a second elongated rod-like member of shorter length than said first member extending only through said proximal portion, said second member being substantially thicker in cross-section than said first member.