novel apparatus are best illustrated with real examples. For example, in FIGS. **9** and **10** is illustrated a section of the main aorta **90** exhibiting in each Figure a typical ruptured aortic aneurysm. The rupture **91** illustrated in FIG. **9** is just below and extends between the right and left renal arteries, **92** and **93** respectively, the aneurysm showing up in these instances as a ballooning in the wall of the aorta as at **94.** In this instance, the piercing point or tip (using the preferred embodiment of the catheter as the example) makes an incision as at **95** in the wall of the aorta to permit entry thereinto of the catheter **10.** Upon entry of the catheter into the aorta **90,** the syringe **84** is pressurized and the elastic annulus **16** expands effecting a form fitting balloon which occludes the interior of the aorta **90.** The balloon stops blood flow downwardly in the aorta **90** by internal occlusion and permits the surgeon to suture the ruptured area **91** or make other necessary repairs. Thereafter, removal of the catheter permits, because of the very small size of the incision **95,** of easy repair to the incision **95** without harmful effect and with minimal loss of blood.

In the ruptured aortic aneurysm depicted in FIG. **10,** and utilizing like numerals to present like things, the rupture **91** is located well below the left and right renal arteries **93** and **92** respectively and slightly above and to the right of the left common iliac **96.** The incision **95** is made in precisely the same way as the incision made by the catheter **10** in FIG. **9.**

In FIG. **11** is shown a typical example of what is known as the Leriche Syndrome wherein an occluding clot occurs at the bifurcation in the aorta **90** at the juncture of the left and right common iliac arteries **96** and **97.** As before, an incision **95** may be made by the end **24** of the trocar associated with the catheter **10** and the clot removed in the normal conventional manner by the surgeon, the balloon **16** serving to occlude blood flow in the aorta without utilizing external clamps.

The catheters of the present invention may also be utilized in pairs or more to isolate a particular section which is to be surgically addressed. To this end, and referring now to FIG. **12,** a defect **101** is shown being closed with a patch graft **102** between the common femoral artery **103** and the superficial femoral artery **104,** adjacent or at the junction of the profunda femoris **105.** For illustrative purposes, and to illustrate the use of apparatus constructed in accordance with the present invention to occlude in pairs, as well as in conjunction with more conventional external occluding clamps, such as the clamp **106,** which is shown clamping the profunda femorus, a pair of intravascular occluding catheters constructed in accordance with the present invention are shown isolating a section of the femoral artery on opposite sides of the defect **101.** As shown a first catheter **100A** is inserted through a self-made incision **110,** the balloon expanded to thereby internally occlude the common femoral artery **103.** Thereafter, a second catheter **100B** with its piercing point makes an incision **111** in the superficial femoral artery and the balloon is then expanded to internally occlude the superficial femoral artery. Thereafter a patch **102** may be easily applied either from a vein graft or even composed of a Dacron plastic. (Of course this type of repair is common in instances where the internal lining of the artery must be removed along with any buildup of atheromata and calcium, i.e. endarterectomy).

In all instances of the examples heretofore described, it should be understood that after the incision has been made by the trocar and the balloon expanded so as to internally occlude the vessel, the trocar may be removed and medication may be applied through the second tube into the area. For example, it may be necessary to insert heparin (an anti-coagulant) into the blood to prevent clotting. Additionally, blood samples may be taken, in all the examples illustrated, by placing a syringe on the Luer lock such as the Luer lock **85** and aspirating the required sample.

After the repair has been completed, the fluid pressure in the first tube is released and the elastic annulus retracts to its previous housing, the catheter is removed and the incision thus made by the piercing point of the trocar may be repaired.

It should be recognized that the catheter of the present invention has many uses. For example, the radiologist may find the catheter extremely useful for dye injection (through the second tube after removal of the trocar) to selected vessels without diffusion of the dye into nonselected vessels. Thus the catheter may be useful in selective arteriography with minimum dye usage.

Another example of the use to which the catheter of the present invention may be put is when a section of bowel must be removed it is offtimes difficult and almost impossible to remove the bowel section without contamination of the surrounding area due to leakage as the section of bowel is removed. Conventionally, the bowel is clamped at spaced intervals with six clamps, two clamps being positioned adjacent one another on opposite sides of the intended incision on one side of the bowel section to be removed, and two more adjacently positioned clamps between which a second incision is made on the opposite side of the bowel section to be removed. An additional clamp is positioned spaced from each clamp pair on each of the sections to be joined. Thereafter the fluid in the remaining two isolated bowel sections may be neutralized by inserting a catheter through the wall of each of the bowel sections thus isolated, and expanding the balloon so as to occlude the incision made by the catheters. After removal of the trocar, it is a simple matter to pump a medication such as an antibiotic into each of the bowel sections thereby neutralizing the possible harmful effects of any leakage of the section when removing the inwardly disposed clamps to sew the previously incised ends, together. It should be understood for purposes of this disclosure, that the bowel is to be considered a vessel.

Thus the catheter of the present invention makes its own incision and permits the occlusion internally of a vessel to which the catheter is applied. Additionally, the trocar may be removed and medication may be applied into the tube from whence it was removed.

Although the invention has been described with a certain degree of particularity, it is understood that the present disclosure has been made only by way of example and that numerous changes in the details of construction, the combination and arrangement of parts, and the method of operation may be made without departing from the spirit and scope of the invention as hereinafter claimed.

What is claimed is:

1. An intravascular occluding catheter comprising a flexible tubular member having a tapered nose at one terminal end of said members, said flexible tubular