CLAIMS

1. A catheter system comprising:

an outer elongated element having an outer elongated element proximal end and an outer elongated element distal end, said outer elongated element having an outer elongated element lumen extending from said outer elongated element proximal end to said outer elongated element distal end and having an outlet port at said outer elongated element distal end, and a proximal occlusion element located at said outer elongated element distal end, said proximal occlusion element proximal to said outlet port, said proximal occlusion element comprising a proximal occlusion element proximal end and a proximal occlusion element distal end;

an inner elongated element having an inner elongated element proximal end and an inner elongated element distal end, and a distal occlusion element located at said inner elongated element distal end, said inner elongated element positioned within said outer elongated element lumen wherein said outer elongated element is coaxially arranged with respect to said inner elongated element, said coaxial arrangement providing a delivery lumen between said inner and outer elongated elements for delivery of a delivery substance to a vessel through said delivery lumen and through said outlet port, wherein said inner elongated element distal end is distal to and movable with respect to said outer elongated element distal end, and wherein said inner elongated element further comprises a pressure relief element at said inner elongated element distal end; and

a guidewire positioned through said pressure relief element.

~~2. The catheter system of claim 1, wherein said inner elongated element further comprises a pressure relief element at said inner elongated element distal end.~~

~~3~~2. The catheter system of claim 1, wherein a distance from said proximal occlusion element proximal end to said proximal occlusion element distal end is in a range of 5-40 cm.

43. The catheter system of claim 1, further comprising at least one inflow occlusion element positioned proximal to said proximal occlusion element.

~~5. The catheter system of claim 4, wherein said at least one inflow occlusion element comprises multiple inflow occlusion elements.~~

64. The catheter system of claim 43, further comprising an inflow occlusion shaft positioned coaxial to said outer elongated element, and wherein said at least one inflow occlusion element is positioned on said inflow occlusion shaft.

75. The catheter system of claim 1 wherein said inner elongated element further comprises a core wire extending from and attached to said inner elongated element distal end and extending to and attached to said inner elongated element proximal end.

~~8. The catheter system of claim 7, wherein said core wire is sandwiched between polymeric layers of a shaft of said inner elongated element.~~

96. The catheter system of claim 1, wherein said delivery substance is a therapeutic or diagnostic agent introduced into said outer elongated element lumen, and said delivery substance is positioned between an outer wall of said inner elongated element and an inner wall of said outer elongated element, and said delivery substance is positioned between said distal and proximal occlusion elements when introduced into a vessel.

~~10. The catheter system of claim 1, wherein said inner elongated element comprises an inner elongated element lumen.~~

~~11. The catheter system of claim 10, further comprising a guidewire positioned within said inner elongated element lumen.~~

~~12~~7. The catheter system of claim 1, further comprising a hub at said outer elongated element proximal end, said hub configured for introducing said delivery substance into said outer elongated element lumen.

~~13~~8. The catheter system of claim ~~12~~7, wherein said hub is further configured for introducing said inner elongated element through said outer elongated element lumen.

~~14~~9. The catheter system of claim ~~2~~1, wherein said pressure relief element has an inner diameter which is approximately 0.002" greater than a diameter of a guidewire to be placed therethrough.

~~15~~10. The catheter system of claim ~~2~~1, wherein said pressure relief element comprises a separate distal element positioned distal to said distal occlusion element.

~~16~~11. The catheter system of claim ~~2~~1, wherein said pressure relief element comprises a passageway through said distal occlusion element.

~~17~~12. The catheter system of claim 1, wherein said distal occlusion element is a fixed wire balloon.

~~18~~13. The catheter system of claim 1, further comprising a guidewire positioned through said outer elongated element.

~~19~~14. The catheter system of claim 1, wherein said inner elongated element comprises an exposed portion having an exposed portion proximal edge at a proximal occlusion element distal end and an exposed portion distal edge at a distal occlusion element proximal end, and wherein said exposed portion has a length extending from said exposed portion proximal edge to said exposed portion distal edge, wherein said length may be varied by moving said inner elongated element with respect to outer elongated element.

~~20~~15. A method for treating a vessel, the method comprising:

introducing an outer elongated element into a vessel, said outer elongated element comprising an outer elongated element lumen therethrough and a proximal occlusion element at a distal end thereof;

introducing an inner elongated element into the vessel, said inner elongated element comprising a distal occlusion element at a distal end thereof and further comprising a pressure relief element at a distal end thereof;

introducing a guidewire through said pressure relief element;

positioning said outer elongated element externally and coaxially to said inner elongated element, and positioning a distal end of said inner elongated element distal to a distal end of said outer elongated element, wherein said distal occlusion element is positionable at varying distances from said proximal occlusion element;

deploying said distal occlusion element and said proximal occlusion element; and

introducing a delivery substance through said outer elongated element into the vessel between said distal and proximal occlusion elements while simultaneously removing blood from the vessel through said pressure relief element while said guidewire is inside said pressure relief element.

~~21~~16. The method of claim ~~20~~15, wherein said positioning said outer elongated element coaxially to said inner elongated element is done prior to said introducing said outer elongated element and prior to said introducing said inner elongated element, and wherein introducing said outer and inner elongated elements are done simultaneously.

~~22. The method of claim 20, wherein said introducing said outer elongated element is done over a guidewire, and wherein said introducing said inner elongated element is done over said guidewire and through said outer elongated element lumen.~~

~~23~~17. The method of claim ~~20~~15, wherein said deploying said distal occlusion element is done prior to said deploying said proximal occlusion element.

~~24~~18. The method of claim ~~20~~15, wherein said deploying said proximal occlusion element is done prior to said deploying said distal occlusion element.

~~25~~19. The method of claim ~~20~~15, further comprising adjusting a distance between said distal occlusion element and said proximal occlusion element prior to said introducing a delivery substance.

~~26~~20. The method of claim ~~20~~15, wherein said introducing said outer elongated element and said inner elongated element is done by ~~positioning a guidewire through a pressure relief element on said inner elongated element and~~ introducing said inner and outer elongated elements together over said guidewire.

~~27~~21. The method of claim ~~20~~15, further comprising perfusing blood through an inner elongated element lumen and into the vessel distal to said distal occlusion element.

~~28~~22. The method of claim ~~27~~21, further comprising removing blood via a supply elongated element, said supply elongated element positioned coaxial to said outer elongated element and proximal to said proximal occlusion element.

~~29. The method of claim 20, further comprising removing said inner elongated element from the vessel while leaving said outer elongated element in the vessel.~~

~~30. The method of claim 20, wherein deploying said distal occlusion element and said proximal occlusion element is done multiple times during a procedure.~~

~~31~~23. The method of claim ~~20~~15, wherein said steps of deploying said distal occlusion element and said proximal occlusion element and introducing said delivery substance comprises repeatedly deploying and introducing so as to establish blood flow in between each of said deployments and introductions.

~~32~~24. The method of claim ~~20~~15, further comprising stopping outflow of blood through a side branch vessel.

~~33~~25. The method of claim ~~32~~24, wherein said stopping is done by deploying an inflow occlusion element proximal to the side branch vessel.

~~34. A method for treating a vessel, the method comprising:~~

~~introducing an outer elongated element into a vessel, said outer elongated element comprising an outer elongated element lumen therethrough and a proximal occlusion element at a distal end thereof, said proximal occlusion element comprising a proximal occlusion element proximal end and a proximal occlusion element distal end;~~

~~introducing an inner elongated element into the vessel, said inner elongated element comprising a distal occlusion element at a distal end thereof;~~

~~positioning said outer elongated element externally and coaxially to said inner elongated element, and positioning a distal end of said inner elongated element distal to a distal end of said outer elongated element, wherein said distal occlusion element is positionable at varying distances from said proximal occlusion element;~~

~~providing an inflow occlusion element proximal to said proximal occlusion element proximal end;~~

~~stopping outflow of blood through a side branch vessel by deploying said inflow occlusion element;~~

~~deploying said distal occlusion element and said proximal occlusion element; and~~

~~introducing a delivery substance through said outer elongated element into the vessel between said distal and proximal occlusion elements.~~

~~35. The method of claim 34, wherein said stopping outflow of blood comprises occluding an inflow occlusion point located proximal to the side branch vessel.~~

~~36. The method of claim 34, wherein said providing an inflow occlusion element comprises providing an extended proximal occlusion element, wherein a~~

~~distance between said proximal occlusion element proximal end and a proximal occlusion element distal end is in a range of 5-40 cm.~~

~~37. The method of claim 34, wherein said providing an inflow occlusion element comprises providing at least one additional occlusion element proximal to said proximal occlusion element.~~

~~38. The method of claim 34, further comprising providing a pressure relief element at a distal end of said inner elongated element and removing blood from the vessel through said pressure relief element.~~

~~39. The method of claim 34, wherein said positioning said outer elongated element coaxially to said inner elongated element is done prior to said introducing said outer elongated element and prior to said introducing said inner elongated element, and wherein introducing said outer and inner elongated elements are done simultaneously.~~

~~40. The method of claim 34, wherein said introducing said outer elongated element is done over a guidewire, and wherein said introducing said inner elongated element is done over said guidewire and through said outer elongated element lumen.~~

~~41. The method of claim 34, wherein said deploying said distal occlusion element is done prior to said deploying said proximal occlusion element.~~

~~42. The method of claim 34, wherein said deploying said proximal occlusion element is done prior to said deploying said distal occlusion element.~~

~~43. The method of claim 34, further comprising adjusting a distance between said distal occlusion element and said proximal occlusion element prior to said introducing a delivery substance.~~

~~44. The method of claim 38, wherein said introducing said outer elongated element and said inner elongated element is done by positioning a guidewire through a pressure relief element on said inner elongated element and introducing said inner and outer elongated elements together over said guidewire.~~

~~45. The method of claim 34, further comprising perfusing blood through an inner elongated element lumen and into the vessel distal to said distal occlusion element.~~

~~46. The method of claim 45, further comprising removing blood via a supply elongated element, said supply elongated element positioned coaxial to said outer elongated element and proximal to said proximal occlusion element.~~

~~47. The method of claim 34, further comprising removing said inner elongated element from the vessel while leaving said outer elongated element in the vessel.~~

~~48. The method of claim 34, wherein deploying said distal occlusion element and said proximal occlusion element is done multiple times during a procedure.~~

~~49. The method of claim 34, wherein said steps of deploying said distal occlusion element and said proximal occlusion element and introducing said delivery substance comprises repeatedly deploying and introducing so as to establish blood flow in between each of said deployments and introductions.~~