ACCESS CLOSURE WITH BLEED MONITORING

BACKGROUND

[0001] Some medical procedures involve accessing a patient's blood vessel. For example, catheterizations involve inserting a catheter into a blood vessel to access other parts of the person such as the heart. To access a blood vessel, a needle is first inserted through the person's skin and into the blood vessel. A wire is then inserted through the needle and the needle is then removed. Other components, such as an introducer sheath are then inserted through the hole in the blood vessel wall. While some vessel wall holes may close themselves, not all do. At the end of the medical procedure, the hole in the blood vessel may need to be manually closed such as through use of any of a variety of blood vessel access closure devices and techniques.

SUMMARY

[0002] Various examples of blood vessel access closure devices are disclosed that include the ability for bioimpedance to be measured. The impedance of the body around the site of a blood vessel hole being closed can be used to determine if the hole has been adequately closed, or whether the hole is still leaking blood.

[0003] According to a first aspect of the present invention, there is provided a blood vessel access closure device includes an inner blood vessel wall support member and an outer blood vessel wall support member. The closure device also includes a deployment member and an electrode. The deployment member is configured to draw the inner and outer blood vessel wall support members towards each other when the inner and outer blood vessel wall members are deployed on opposite sides of a blood vessel wall during closure of a hole in the blood vessel wall. The electrode is configured to be attached to the deployment member and configured to be used to measure impedance.

[0004] According to a second aspect of the present invention, there is provided a blood vessel access closure device includes a suture wire and an electrode. The suture wire is configured to close a hole in a blood vessel. The electrode is coupled to the suture wire and is configured to be attached to the deployment member and configured to be used to measure impedance.

[0004a] According to a third aspect of the present invention, there is provided a blood vessel access closure device, comprising: a guidewire having an electrode; a collagen plug configured to receive the guidewire to thereby close a hole in a blood vessel; and a first electrode configured to be attached to the deployment member and configured to be used to measure impedance.

BRIEF DESCRIPTION OF THE DRAWINGS

[0005] For a detailed description of various examples, reference will now be made to the accompanying drawings in which:

[0006] FIG. 1 illustrates an access closure system with an electrode usable to detect bleeding.

[0007] FIG. 2 illustrates another example of an access closure system that can detect bleeding.

[0008] FIG. 3 illustrates yet another access closure system that can detect bleeding.

[0009] FIG. 4 shows an example of an access closure system including an adhesive patch with one or more electrodes to detect bleeding.

[0010] FIG. 5 shows additional detail of the example adhesive patch.

[0011] FIG. 6 illustrates an example in which the adhesive patch is connected to a bedside monitor.

[0012] FIG. 7 shows an example of the electronics included in the adhesive patch operative to measure impedance to detect bleeding.

[0013] FIG. 8 shows an example of an adhesive patch with multiple electrodes arranged in a line.

[0014] FIG. 9 shows an example of the use of a collagen plug to seal a hole in a blood vessel in conjunction with a guidewire having an electrode usable to measure impedance for bleed detection.

CLAIMS

What is claimed is:

1. A blood vessel access closure device, comprising:

an inner blood vessel wall support member;

an outer blood vessel wall support member;

a deployment member configured to draw the inner and outer blood vessel wall support members towards each other when the inner and outer blood vessel wall members are deployed on opposite sides of a blood vessel wall during closure of a hole in the blood vessel wall; and

a first electrode configured to be attached to the deployment member and configured to be used to measure impedance.

2. The blood vessel access closure device of claim 1, wherein the deployment member comprises a conductive suture wire attached to the first electrode.

3. The blood vessel access closure device of claim 1, further comprising an adhesive patch configured to be placed on a person's skin over the blood vessel, the adhesive patch comprising a second electrode.

4. The blood vessel access closure device of claim 1, further comprising an adhesive patch configured to be placed on a person's skin over the blood vessel, the adhesive patch comprising a plurality of electrodes.

5. The blood vessel access closure device of claim 4, wherein the adhesive patch comprises a circuit configured to use the first electrode and one or more of the plurality of electrodes on the adhesive patch to measure multiple impedance values.

6. The blood vessel access closure device of claim 4, wherein the adhesive patch comprises a visual indicator of one or more of the multiple impedance values.

7. The blood vessel access closure device of claim 4, wherein the adhesive patch has a rectangular shape, the rectangular shape having a width and a length, and the plurality of electrodes are positioned along the length.

8. The blood vessel access closure device of claim 4, wherein the adhesive patch is circular.

9. The blood vessel access closure device of claim 3, wherein the adhesive patch includes a circuit configured to transmit a wireless signal, the wireless signal indicative of the impedance.

10. The blood vessel access closure device of claim 1, wherein the first electrode is bioabsorbable.

11. A blood vessel access closure device, comprising:

a suture wire configured to close a hole in a blood vessel; and

a first electrode coupled to the suture wire and configured to be attached to the deployment member and configured to be used to measure impedance.

12. The blood vessel access closure device of claim 11, further comprising an adhesive patch configured to be placed on a person's skin over the blood vessel, the adhesive patch comprising a second electrode.

13. The blood vessel access closure device of claim 11, further comprising an adhesive patch configured to be placed on a person's skin over the blood vessel, the adhesive patch comprising a plurality of electrodes.

14. The blood vessel access closure device of claim 13, wherein the adhesive patch comprises a circuit configured to use the first electrode and one or more of the plurality of electrodes on the adhesive patch to measure multiple impedance values.

15. The blood vessel access closure device of claim 13, wherein the adhesive patch comprises a visual indicator of one or more of the multiple impedance values.

16. The blood vessel access closure device of claim 13, wherein the adhesive patch has a rectangular shape, the rectangular shape having a width and a length, and the plurality of electrodes are positioned along the length.

17. The blood vessel access closure device of claim 13, wherein the adhesive patch is circular.

18. The blood vessel access closure device of claim 12, wherein the adhesive patch includes a circuit configured to transmit a wireless signal, the wireless signal indicative of the impedance.

19. A blood vessel access closure device, comprising:

a guidewire having an electrode;

a collagen plug configured to receive the guidewire to thereby close a hole in a blood vessel; and

a first electrode configured to be attached to the deployment member and configured to be used to measure impedance.

20. The blood vessel access closure device of claim 19, further comprising a circuit coupled to the first electrode, the circuit to use the first electrode to measure impedance for bleed detection.