Claims

1. A system for anastomosis of a tubular structure, the system comprising:

   a device configured such that, when the device is arranged in the tubular structure, an anastomosis is obtained in the tubular structure and a cavity is formed between the device and the tubular structure; and

   a pump in fluid communication with the cavity and configured to temporarily apply a negative pressure to the cavity.

2. The system of claim 1, wherein the pump is configured to apply the negative pressure to the cavity periodically.

3. The system of claim 2, wherein the period at which the pump is configured to apply the negative pressure to the cavity is inversely proportional to the heart rate of a patient having the tubular structure.

4. The system of claim 2 or 3, wherein the period at which the pump is configured to apply the negative pressure to the cavity is an integer multiple of the time between consecutive heartbeats of a patient having the tubular structure.

5. The system of any preceding claim, wherein the magnitude of the negative pressure is lower than the magnitude of the diastolic pressure of a patient having the tubular structure.

6. The system of any preceding claim, wherein the pump is a vacuum pump.

7. The system of any preceding claim, further comprising at least one catheter in fluid communication with the cavity at a first end, and in fluid communication with the pump at a second end.

~~8. The system of claim 7, wherein, in use, the second end of the at least one catheter is configured to pass through the tubular structure and exit through the rectum of a patient having the tubular structure.~~

~~9.~~8. The system of claim 7~~ or 8~~, wherein the at least one catheter comprises at least two catheters.

~~10.~~9. The system of claim ~~9~~8, wherein a first catheter of the at least two catheters is configured as an inlet to the cavity for a contrast medium, and a second catheter of the at least two catheters is configured as an outlet from the cavity for the contrast medium.

~~11.~~10. The system of claim ~~9 8~~ or ~~10~~9, wherein the at least two catheters comprise four catheters.

~~12.~~11. The system of any preceding claim, further comprising a pressure sensor configured to measure the pressure in the cavity.

~~13.~~12. The system of claim ~~12~~11, wherein the pressure sensor is integrated with the pump.

~~14.~~13. The system of any preceding claim, further comprising an absorbent element disposed between the pump and the cavity.

~~15.~~14. The system of any preceding claim, wherein the tubular structure comprises a first part and a second part, and the device is configured such that, when the device is arranged in the tubular structure:

the anastomosis is obtained at a contact area between the first part of the tubular structure and the second part of the tubular structure; and

the cavity is formed between the device, the first part of the tubular structure and the second part of the tubular structure.

~~16. The system of any preceding claim, wherein the device comprises a first member and a second member of generally hollow open configurations such that, when the device is arranged in the tubular structure, the anastomosis is obtained at a contact area between the first and second members and the cavity is formed between the first and second members and the tubular structure.~~

~~17. The system of claim 16, wherein the first member and/or the second member is provided with at least one hole arranged to enable the fluid communication between the pump and the cavity.~~

~~18. The system of claim 16 or 17, wherein each of the first member and the second member comprises a rigid part and an elastic part arranged such that the contact area is between the elastic parts and the cavity is formed between the rigid parts and the tubular structure.~~

~~19. The system of claim 18, wherein the elastic parts are ring shaped.~~

~~20. The system of claim 18 or 19, wherein the elastic parts are made of a polymeric material, such as an elastomer.~~

~~21. The system of any of claims 18 to 20, wherein the elastic parts are made of a biocompatible material and/or a biodegradable material.~~

~~22. The system of any of claims 18 to 21, wherein each elastic part and corresponding rigid part, in use, form a continuous line of contact in which necrosis is induced in the tubular structure.~~

~~23. The system of any of claims 18 to 22, wherein the rigid parts are configured to connect to each other such that a distance is formed between the elastic parts.~~

~~24. A method for anastomosis of a tubular structure, the method comprising:~~

arranging a device in a tubular structure such that an anastomosis is obtained in the tubular structure and a cavity is formed between the device and the tubular structure; and

applying a negative pressure to the cavity temporarily using a pump in fluid communication with the cavity.

25. The method of claim 24, comprising applying the negative pressure to the cavity periodically.

26. The method of claim 25, wherein the period at which the pump is configured to apply the negative pressure to the cavity is inversely proportional to the heart rate of a patient having the tubular structure.

27. The method of claim 25 or 26, wherein the period at which the pump is configured to apply the negative pressure to the cavity is an integer multiple of the time between consecutive heartbeats of a patient having the tubular structure.

28. The method of any of claims 24 to 27, comprising applying the negative pressure at a magnitude lower than the magnitude of the diastolic pressure of a patient having the tubular structure.

29. The method of any of claims 24 to 28, wherein the pump is a vacuum pump.

30. The method of any of claims 24 to 29, further comprising arranging at least one catheter between the pump and the cavity, such that a first end of the catheter is in fluid communication with the cavity, and a second end of the catheter is in fluid communication with the pump.

~~31. The method of claim 30, further comprising arranging the at least one catheter such that the second end of the at least one catheter passes through the tubular structure and exits through the rectum of a patient having the tubular structure.~~

~~32. The method of claim 30 or 31, wherein the at least one catheter comprises at least two catheters.~~

~~33. The method of claim 32, further comprising providing a contrast medium to the cavity via a first catheter of the at least two catheters, and removing the contrast medium from the cavity via a second catheter of the at least two catheters.~~

~~34. The method of claim 32 or 33, wherein the at least two catheters comprise four catheters.~~

~~35. The method of any of claims 24 to 34, further comprising measuring the pressure in the cavity.~~

~~36. The method of claim 35, comprising measuring the pressure in the cavity using a pressure sensor integrated with the pump.~~

~~The method of any of claims 24 to 36, further comprising disposing an absorbent element between the pump and the cavity.~~