

## **Seromas: Cause and Management**

***Following subcutaneous implantation of medical devices, seromas can develop due to several causes. When seromas do occur, proper medical management may prevent further complications.***

Anyone who has done surgery involving the removal of a large mass or implanting a foreign body has experienced feelings of frustration and anxiety when an animal who previously appeared to be recovering well from surgery suddenly develops a swelling at the surgical site. There is no redness, no fever, and no discharge. No, it is not an abscess; it is a seroma. When it comes to treating the problem, however, sometimes we almost wish it was an abscess. At least an abscess has a defined course of therapy with good chance for a positive outcome.

### **What is a seroma?**

A seroma is defined as a sterile accumulation of serum in a circumscribed location in the tissue. The difference between a seroma and an abscess is that an abscess involves the presence of white blood cells, bacteria, and the breakdown products of both. In other words, an abscess is defined as an infection. A seroma, on the other hand, is just fluid, serum that has accumulated in a dead space in the tissue. It is the result of tissue insult and the product of tissue inflammation and the body's defense mechanisms.

### **Why does a seroma form?**

Before we discuss how to treat it, let's try to find out why it happened in the first place. First, be assured that it is a perfectly normal response. The body is simply reacting to the presence of a dead space within the tissue that was previously attached to something. When we remove a large mass, or create a defect (such as making the subcutaneous pocket needed for the DSI transmitter body), we damage the very small vessels that previously ran from the underlying tissue (i.e., muscle, connective tissue) to the overlying tissue (i.e., skin, muscle). Although these vessels do not cause significant blood loss, they do allow escape of serum into the area. There is also the resulting tissue damage that occurs regardless of how carefully we dissect. This tissue damage results in cellular death. The body's reaction is an inflammatory one. Because of the inflammation, cell death, and increased vascular permeability, fluid can accumulate in the newly created space. This process will generally resolve over time if there is some form of natural drainage, if there is not continued irritation to the area, if circulation to the area is sufficient, and if the animal is in good health.

### **What if the seroma does not resolve?**

What if it gets very large or the animal starts to irritate the site? Sometimes we are not lucky and fate works against us. So yes, sometimes it may be necessary to intervene, to try and "do something" about the problem. The first and best way to treat a seroma is to prevent it. The best

way to prevent a seroma is not to give it any place to form. It's easier said than done, and in the case of the implanted transmitter, it is virtually impossible. Even if you meticulously close as much of the subcutaneous tissue around the transmitter body as possible, some dead space may remain. The amount of space, however, may be insignificant enough so that the serum that accumulates is minor. In fact, this is what happens most of the time. Another precaution to take is to be as gentle with the tissue as possible. When preparing the pocket always be sure to use a blunt dissection technique. This would mean either using your fingers or a blunt instrument to tear the underlying tissue. The most important thing to remember is that you do not want to use a sharp instrument to cut the tissue. Tearing the tissue causes the small vessels to vasoconstrict, which will usually stop any bleeding. The use of clamps, suture, or cautery may also be effective in sealing the small bleeders. In some cases, applying pressure over the surgical site for 3-5 days following surgery will also prevent fluid accumulation. This can be done by using a form-fitting jacket or by bandaging.

When a seroma becomes a clinical concern, such as when the animal begins to irritate the site, or its size causes concern for the viability of the overlying tissue, it should first be treated conservatively. The first inclination is to drain it. Remove the fluid and everything will be just fine. Unfortunately, once the fluid is gone, the dead space is not and the cavity may simply fill up again. Over time, fibrotic tissue will eventually fill all of the space and the body will reabsorb the fluid on its own.

### **Can anything be done to speed this natural healing?**

Increasing the circulation to the healing area will often help to reduce the swelling. The fluid will be reabsorbed into the blood stream faster and the increased blood flow will bring oxygen and nutrients to the newly forming tissue. Heat is an excellent way to increase circulation to an area. Hot packing a seroma is a simple, inexpensive, and very effective way to medically manage a seroma. Applying a moist, very warm towel, or gauze pack to the swollen area for 10-15 minutes several times daily will often be the only treatment needed to resolve the swelling. In some cases, the judicious use of anti-inflammatory medication will also help to reduce the amount of fluid that accumulates. However, keep in mind that some anti-inflammatory medications (i.e., glucocorticoid) can retard healing if used in high doses for an extended period of time.

There will be cases when conservative medical management may not be the best option. Sometimes draining the seroma may be your only choice. If this is the case, keep several things in mind. First, a seroma is a sterile condition. However, if you stick a needle into it and introduce some bacteria, it is an ideal media for bacterial growth. What started out as a sterile accumulation of fluid will now become a raging abscess. If care is taken to use strict aseptic technique, draining can be done without introducing bacteria. However, the problem of reaccumulating fluid may still occur. This may require repeated draining of the seroma and the chance for contamination is increased. A better way to deal with a seroma that does not appear to be resolving on its own is to create a permanent drain and treat with antibiotics to prevent infection. A permanent drain will allow the fluid to continuously escape until the body can

complete the healing process on its own. A drain can be an artificial implanted device such as a piece of rubber tubing (Penrose drain), or it can be as simple as creating an opening at the lowest edge of the seroma, and keeping this open and clean to allow continued drainage.

Although non-clinical seromas probably happen every time we implant a transmitter, clinically relevant seromas are actually not that common. Most surgeons do a very good job of closing the dead space and using gentle tissue handling. If you are having a significant problem with seromas, it is possible that there is some underlying cause that may need to be corrected. Consult with your staff veterinarian or contact DSI We will be happy to work with you to resolve the problem.