Surgical Note

# 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 performed surgery involving the removal of a large mass or implantation of a foreign body may have experienced an animal, who previously appeared to be recovering well from surgery, suddenly developing a swelling at the surgical site. If there is no redness, no fever, and no discharge, the likely diagnosis is a seroma.

## What is a seroma?

A seroma is defined as a sterile accumulation of serum in the dead space of tissue. It is the result of tissue insult and the product of tissue inflammation and the body's defense mechanisms. The difference between a seroma and an abscess is the presence of white blood cells and bacteria. In other words, an abscess is defined as an infection and a seroma is just serous fluid.

## Why does a seroma form?

Be assured that a seroma is a perfectly normal biological response. The body is simply reacting to the presence of a dead space within the tissue that was previously attached to something. When a large mass is removed or a defect created, i.e. making the subcutaneous pocket needed for the device body, very small vessels that previously ran from the underlying tissue (muscle, connective tissue) to the overlying tissue (skin, muscle) are damaged. 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 the area is dissected. 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, there is not continued irritation to the area, circulation to the area is sufficient, and the animal is in good health.

## What if the seroma does not resolve?

Sometimes it may be necessary to intervene and try to resolve the problem. The best way to treat a seroma is to prevent by not giving it any place to form. In the case of an implanted telemetry device, it is virtually impossible to close all of the dead space. Most of the time the amount of space may be insignificant enough so that the serum accumulation is minor.

Another way to help prevent seromas is to be as gentle as possible with the tissue when preparing the pocket by only using blunt dissection. This is best achieved by using fingers or a blunt instrument to


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dissect the underlying tissue. Blunt dissection causes the small vessels to vasoconstrict, which will usually stop any bleeding. **Do not** use a sharp instrument to cut the tissue. The use of clamps, suture, or cautery may also be effective in sealing the small bleeding vessels. Additionally, applying pressure over the surgical site for 3-5 days following surgery may also prevent fluid accumulation. This can be done by using a form-fitting jacket or bandage material.

When a seroma becomes a clinical concern, it should first be treated conservatively. While the first inclination is to drain it, once the fluid is gone, the dead space remains and the cavity may simply fill up again. Additionally, this process could introduce bacteria and create an infection. Over time, fibrotic tissue will fill all the dead 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 slow healing if used in high doses for an extended period.

There will be cases when conservative medical management may not be the best option. Sometimes draining the seroma may be the only choice. Since a seroma is a sterile condition, draining may introduce some bacteria and create an infection. What started out as a sterile accumulation of fluid may become an abscess. If strict aseptic technique is used, 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.

Although non-clinical seromas likely develop every time a device is implanted, clinically relevant seromas are not that common. If significant problems with seromas keep arising, it is possible that there is some underlying cause that may need to be corrected and surgical techniques should be assessed.


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