

## Fibrin glue as a non-invasive outpatient treatment for post-arthroscopic knee seromas

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**Abstract** Post-surgical seromas and cysts have been reported across many surgical subspecialties including orthopaedics. Treatments include both invasive surgical approaches and more recently reported non-invasive techniques. Non-invasive approaches currently include compressive wrapping, vasopneumatic cryotherapy, and motion exercises. Persistent lesions have been treated with talc or doxycycline sclerodesis. This case presents a patient with a post-arthroscopic seroma that was treated with fibrin glue in an outpatient setting. Fibrin glue has not been reported in the post-arthroscopy outpatient setting to address cystic lesions. This case suggests a viable non-invasive treatment option for these lesions.

*Level of evidence V.*

**Keywords** Fibrin glue · Seroma treatments · Post-arthroscopic seroma

### Introduction

Post-surgical seromas and cysts can occur through a number of mechanisms and have been reported across many surgical subspecialties including orthopaedics [2, 4, 7–9]. A seroma is best described as a pocket of serous fluid that may accumulate after tissue damage due to injury, or due to iatrogenic causes as in surgery. Formation occurs

through the disruption of peripheral blood vessels, which leads to plasma seeping into the affected area. There is also a subsequent inflammatory process that results in additional fluid exudate. Seromas that form post-injury are usually due to a direct blow or a shear force [2, 3, 7]. The latter is termed a Morale Lavallee lesion and has been reported in many sports medicine journals. Regardless of the aetiology, most seromas will reabsorb over time [3]. However, there are those that become persistent in nature requiring further intervention such as drainage through aspiration or even further surgical intervention. Patients often become frustrated, and it is not uncommon that a persistent seroma may need to be drained multiple times before resolution. In some instances, the seroma do not resolve even after repetitive drainage and alternative therapies need to be considered. These include both invasive surgical approaches and more recently reported non-invasive techniques [3, 7, 10]. Current non-invasive approaches include compressive wrapping, vasopneumatic therapy, and motion exercises (these methods are somewhat complicated by patient compliance). There has also been some success with injectable talc or doxycycline sclerodesis which tends to cause a scarring down of the seroma pocket through an irritant process [10]. Although surgery may be a consideration for the persistent seroma, the majority of patients wish to exhaust non-surgical options before proceeding with a surgical intervention.

This case presents a patient with a persistent post-arthroscopic seroma that was successfully treated with fibrin glue in an outpatient setting. Recurrent or persistent seromas can be a frustrating problem without simple non-invasive cure. Fibrin glue has been used previously in the management and prevention of post-surgical breast seromas and in general orthopaedic surgeries, but has not been reported in the post-arthroscopy outpatient setting to

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address this type of cystic lesion. This case report suggests a novel non-invasive treatment option for these persistent lesions that are simple to do and painless for the patient.

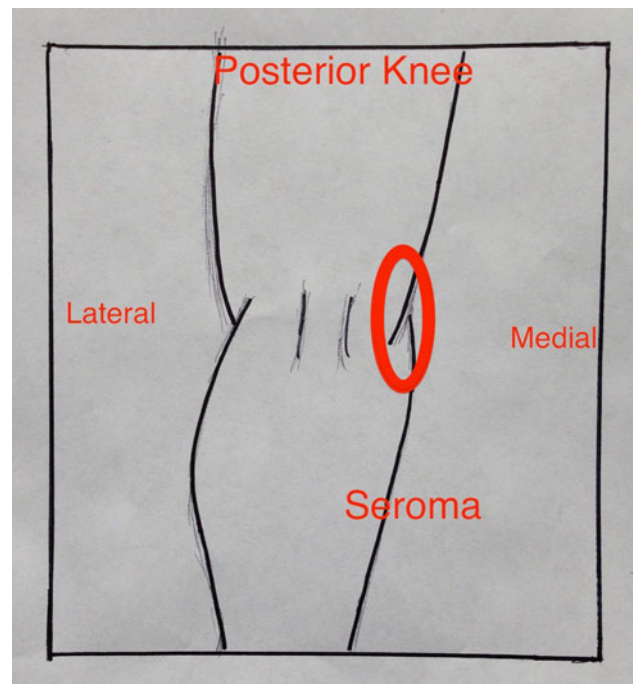
### Case report

Patient C.S. is a 52-year-old female who presented with pain and swelling at the posterior-medial aspect of her right knee for several days prior to clinic presentation. She had previously undergone right knee arthroscopy with partial lateral meniscectomy and loose body removal 1 month prior to presentation and this fluid accumulation began approximately 3 weeks post-operatively. During the surgery, an accessory posterior-medial portal was made to remove the 8-mm loose body from the joint space. During the removal process, the loose body was lost in the posterior soft tissues and an attempt to retrieve it was made using blunt finger dissection. The remainder of the procedure was completed without. The patient was compliant with all post-procedure instructions.

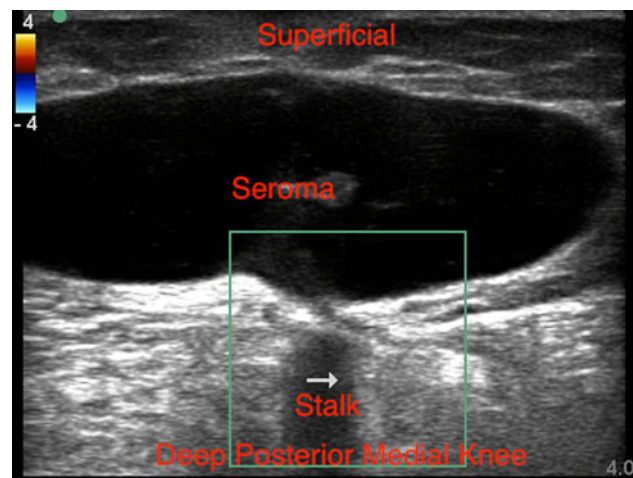
Physical examination showed well-healed incisions, near normal range of motion, and strength. Her neurovascular examination was normal, and she had no instability of the knee. On palpation, she was found to have a large fluctuant fluid collection at the posterior-medial aspect of the knee at the site of the accessory incision (Fig. 1). Ultrasound evaluation was performed and revealed a  $7.5 \times 7$  cm fluid collection posterior-medially in the deep subcutaneous tissue. The fluid was seen tracking through the arthroscopy port through the semimembranosus sitting in a similar location to a typical popliteal cyst adjacent to the medial head of the gastroc and semimembranosus (Fig. 2). No loose body was visualized on ultrasound examination.

The patient underwent ultrasound-guided aspiration three times with injection with corticosteroid. She was wrapped with a compressive dressing each time post-procedure. Alternate options were discussed to address the persistent cyst. These included surgery, doxycycline sclerodesis, and the use of fibrin glue (off label use).

At 4-week follow-up, the patient again had a  $7 \times 7$  cm fluid collection. She was consented for aspiration and fibrin glue injection. The lesion was localized with ultrasound, taking care to isolate the capsular defect and stalk from which the cyst was originating. About 30 mL of serous fluid was removed before the fibrin glue was injected adjacent to the stalk and across the length of the facial defect. The entire pouch was sealed at the end of this procedure. There were no complications during the procedure. The patient returned for follow-up evaluation and ultrasound at 2 and 6 weeks, and there was complete resolution of the pocket, with no fluid visible on ultrasound.



**Fig. 1** Drawing of posterior knee depicting location of seroma



**Fig. 2** Ultrasound image of posterior knee showing seroma and stalk

On follow-up phone consultation 1 year after the procedure, there remained no seroma re-accumulation and her knee continued to feel good.

### Discussion

Seromas occur in response both to mechanical injury and to surgical manipulation of the tissue. While the percentage of patients that develop a post-arthroscopic seroma or cyst is very small, these lesions can be quite a nuisance to the patient, especially when they do not resolve after aspiration

[4, 5, 8]. While treatment options do vary, in the past, they have mainly been surgical. For patients, these surgical approaches require increased recovery time and a greater morbidity associated with the surgical exposure. More recently, there has been a shift towards less invasive techniques. Some of these include compressive wrapping, vasopneumatic cryotherapy, and motion exercises. Despite the use of these new and less invasive treatments, many seromas go on to become persistent in nature requiring alternative methods. Doxycycline sclerodesis has shown some positive outcomes in treatment for the persistent seroma, but there are few other suggested treatments before surgery is usually discussed [2, 10].

Fibrin sealant (fibrin glue) is a surgical adhesive that is used in a variety of clinical settings. It is composed of concentrated fibrinogen and factor XIII along with thrombin and calcium. These active ingredients simulate the final stage of the clotting cascade. Fibrin glue has been used by plastic surgeons in the management of post-surgical breast seromas and in general orthopaedic surgeries [1, 6]. In general, it has a very good safety profile and if used correctly is very efficacious. The literature suggests that the use of fibrin glue does not always prevent seroma formation, but does reduce seroma magnitude and the need for repeat drainage procedures. There also seems to be a role of fibrin glue products in preventing persistent seromas and the complications that follow [3, 7, 9].

This case has highlighted a patient with a persistent seroma that was successfully treated non-invasively with fibrin glue in an outpatient setting. While it is true that a percentage of these lesions will likely resolve spontaneously, we do know that many will not and will require further treatment. The use of fibrin glue is non-invasive and is tolerated well by patients. This patient had failed other conservative treatments and was weary of further surgical interventions.

## Conclusion

Although the uncomplicated and small seroma may resolve spontaneously, many of these lesions will become

persistent and need alternative treatments. Other studies on non-invasive techniques have shown benefit from doxycycline sclerodesis, and compressive wrapping, but when these fail, invasive surgery is often the next step. Fibrin glue has been used previously in the management of post-surgical breast seromas and in general orthopaedic surgeries, but has never been reported to be used in this type of setting. Although larger studies are certainly needed, this case suggests yet another non-invasive treatment option.

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