

Successful use of doxycycline as sclerosing agent with wound vac to treat chronic groin seroma: A case study

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Abstract

Introduction: Seromas are one of the common post operative complications that surgeons must manage. There are several modalities that surgeons utilize to treat this problem including both operative and non-operative strategies. This case report describes utilizing KCI Veraflo wound vac with doxycycline sclerotherapy to treat a chronic groin seroma.

Case: This is a case of a 70 yo M with history of severe aortic stenosis who underwent elective transcatheter aortic valve replacement (TAVR) complicated by post operative common femoral artery pseudoaneurysm requiring readmission for IV antibiotics and return to operating room for exploration, vein angioplasty, and sartorius muscle flap. Following this surgery, the patient developed a chronic groin seroma which was ultimately successfully treated using KCI Veraflow wound vac with doxycycline sclerotherapy.

Discussion: Seroma is a common and frustrating problem faced by plastic surgeons. Sclerotherapy has been reported as a treatment modality with a variety of sclerosants. Doxycycline has been reported as a safe and effective sclerosing agent. Utilizing KCI veraflow wound vac to deliver doxycycline sclerosant provides the combination of repeated exposure of sclerosing agent to wound bed and negative pressure to prevent recurrent of fluid collection. This case describes the use of this combination to treat a chronic groin seroma.

Conclusion: Combining doxycycline sclerosant and KCI Veraflow wound vac is a safe and effective treatment for chronic groin seromas.

Keywords: Groin reconstruction; Muscle flap; Seroma; Chronic seroma; Sclerosant; Doxycycline; Wound vac; Irrigating wound vac; Veraflow.

Introduction

Seromas are one of the most common surgical complications surgeons encounter with rates as high as 38% for abdominal procedures [1] and 20% groin surgery [9,10]. Despite relatively high rate of seromas that surgeons encounter there is currently no gold standard for treatment. This leaves surgeons utilizing variety of techniques to treat seromas including percutaneous aspiration, surgical drainage, and various sclerosing agents. Current literature for chemical management of seromas originates from the management of pneumothoraces and pleural effusions [2]. There are a few case reports describing the use of doxycycline as a sclerosing agent for post operative seromas, however none that describe the use in chronic groin seromas. This report describes the use of doxycycline to treat post operative seroma utilizing the 3M™ Veraflo™ Therapy wound vac (St. Paul, Minnesota).

Case Presentation

A 70 yo obese male with a history of severe aortic stenosis who underwent elective transcatheter aortic valve replacement (TAVR) procedure complicated by post operative bacteremia with common femoral artery (CFA) pseudoaneurysm requiring readmission for IV antibiotics. While admitted for IV antibiotics he was noted to have increased swelling in right groin. PET/CT was obtained revealing soft tissue stranding adjacent to known right common femoral artery pseudoaneurysm, suggestive of inflammatory process with superimposed infection. Due to suspected infected pseudoaneurysm patient was taken to the operating room with vascular surgery for exploration of pseudoaneurysm and right femoral artery vein patch angioplasty.

At this time plastic surgery performed right sartorius muscle flap for vascular coverage leaving 2 drains in place. Patient was discharged on post operative day 6 with no evidence of surgical complications. On post operative day 12 the patient was seen in plastic surgery clinic after noting one his JP drain was no longer functioning, and he was having excessive drainage from incision site. At this time there was no evidence of seroma formation however the drain was simply clogged; the drain was stripped and subsequently began functioning appropriately. On post operative day 20, he was seen in follow up where this drain was again noted to be clogged at this point the decision was made to remove the repeatedly clogged drain while leaving the other drain in place. At the next follow up visit (post operative day 41 he reported >500 cc output per day from his remaining drain and slight fullness was noted around the operative site. Due to high volume drainage from post operative site the decision was made to return to the operating room for exploration of groin, drainage of seroma, and application of doxycycline sclerosing agent to obliterate seroma cavity. Intra-operatively, a chronic seroma cavity measuring 5x4 cm was noted. The wound was copiously irrigated and a 3M™ Veraflo™ Therapy wound vac was applied. A solution of 250 mg doxycycline with 150 mg lidocaine in 50 cc syringe was instilled into the area as a sclerosing agent to dwell for 2 hours. This was set to instill into the cavity every 12 hours with normal saline irrigations in between the doxycycline installations. This process was repeated for a total of 3 days. Patient tolerated doxycycline irrigations well. On the day of discharge, the irrigating wound vac was removed and replaced with 3M™ V.A.C ® Ultra Therapy Unit to be changed at home every Monday, Wednesday, and Friday. The patient was seen in clinic 27 days

post operatively and the wound was noted to be granulating nicely with no evidence of fluid accumulation, skin break down, or infection. He was again seen on post operative day 41 where his wound was essentially healed, with no evidence of re-accumulation of fluid collection, seroma cavity, skin breakdown or infection.

Discussion

Seromas are a common post operative complication that surgeons across nearly every subspecialty are faced with. The formation of post operative seroma is thought to be multifactorial including fluid accumulation from transection of lymphatic channels, plasma, and exudation from inflamed tissue [2-3]. Many specialists hypothesize that regions of the body rich in lymphatics are at increased risk of post operative seroma formation. This is thought to be, at least in part, secondary to disruption of lymphatics which is extensively described in the breast literature [4,6-8]. It has also been hypothesized that this same phenomenon is common in the groin surgery due to the abundance of lymphatics [11-14]. There are several methods utilized for seroma prevention that have been described. In 2016 Janis et al. published a systemic review highlight these numerous modalities to include the use of closed-suction drains, maintaining drains until minimal output is reported, using sharp or ultrasonic dissection rather than electrocautery, ligating blood vessels with sutures or clips, using quilting or progressive tension sutures to obliterate dead space, using fibrin or thrombin and immobilizing the surgical site postoperatively [15]. Despite the numerous modalities for prevention of seromas, surgeons continue to be faced with managing this complication. Treatment of post operative seromas range from non-operative measures including compression and percutaneous drainage to operative intervention. There have been numerous publications describing various management strategies for seromas including incision and drainage, flap-coverage, lymphatic ligation, and vacuum-assisted dressings [5,11,14,16,17]. A case study published by Mazza and Sommariva described using video assisted axilloscopy and ICG lymphography with SPIES system to identify and ligate lymph vessels which were thought to be contributing to chronic lymphocele [17]. This is an innovative approach to treatment, albeit costly and time consuming due to the equipment required. Despite the vast amount of information in the literature and new innovations there remains no gold standard to treat chronic seromas leaving surgeons to question the best treatment for their patients.

The use of sclerosing agents for the management of seromas originate in the literature for treatment of pneumothorax and pleural effusions [2]. There are also various small scale case reports and studies describing this technique to treat seromas in various other areas of the body including abdomen, thigh, and breast to name a few [2,18,19]. A systemic review by Snood et al. aimed to assess the literature on the use of sclerosants to treat seromas. This study highlights several different sclerosing agents used by surgeons including talc, tetracycline antibiotics, ethanol, polidocanol, erythromycin, OK-432, fibrin glue, and povidone-iodine. Tetracycline antibiotics was the most used sclerosing agent with doxycycline being the antibiotic of choice. Doxycycline is a favorable sclerosing agent as it is widely available, painless, and has a positive safety profile [2]. In this case we elected to utilize with 3M™ Veraflo™ Therapy wound vac to deliver the doxycycline to the wound bed to act as our sclerosing agent. There are limited number of reports utilizing this technique in other areas of the body however application in the groin has not been reported. Using the 3M™ Veraflo™ Therapy wound vac allowed the wound to have prolonged exposure to the sclerosing agent

to facilitate resolution of the seroma. This technique allowed us to treat this seroma efficiently and effectively without the need for multiple procedures or more invasive surgery such as a muscle flap.

Conclusion

Combining doxycycline sclerotherapy with 3M™ Veraflo™ Therapy wound vac is a safe and effective treatment for chronic groin seromas. This therapy allows for repeated delivery of sclerosing agent to the wound bed and the addition of negative pressure to prevent accumulation of fluid collection. This is recommended as an initial therapy of choice due to the favorable safety profile, effectiveness, and ease of treatment.

References

1. Smith MM, Lin MP, Hovsepian RV, Wood D, Nguyen T, Evans GR, Wirth GA. Postoperative seroma formation after abdominoplasty with placement of continuous infusion local anesthetic pain pump. *Can J Plast Surg.* Winter. 2009 ;17(4):127-9. doi: 10.1177/229255030901700411. PMID: 21119843; PMCID: PMC2827279.
2. Sood A, Kotamarti VS, Therattil PJ, Lee ES. Sclerotherapy for the Management of Seromas: A Systematic Review. *Eplasty.* 2017; 17: 25. PMID: 28890747; PMCID: PMC5575675.
3. Janis, Jeffrey E. M.D.; Khansa, Lara Ph.D.; Khansa, Ibrahim M.D. Strategies for Postoperative Seroma Prevention: A Systematic Review. *Plastic and Reconstructive Surgery.* 2016; 138(1): 240-252. doi: 10.1097/PRS.0000000000002245.
4. Bonnema J, van Geel AN, Ligtenstein DA, Schmitz PI, Wiggers T. A prospective randomized trial of high versus low vacuum drainage after axillary dissection for breast cancer. *Am J Surg.* 1997; 173: 7679.
5. Shermak MA, Rotellini-Coltvet LA, Chang D. Seroma development following body contouring surgery for massive weight loss: patient risk factors and treatment strategies. *Plast Reconstr Surg.* 2008; 122: 280-8.
6. Petrek JA, Peters MM, Nori S, Knauer C, Kinne DW, Rogatko A. Axillary lymphadenectomy. A prospective randomized trial of 13 factors influencing drainage including early or delayed arm mobilization. *Arch Surg.* 1990; 125: 378-382.
7. Sampathraju S, Rodrigues G. Seroma formation after mastectomy: pathogenesis and prevention. *Indian J Surg Oncol.* 2010; 1(4): 328-33. doi: 10.1007/s13193-011-0067-5. Epub 2011 Apr 2. PMID: 22693384; PMCID: PMC3244263.
8. Loo WT, Chow LW. Factors predicting seroma formation after mastectomy for Chinese breast cancer patients. *Indian J Cancer.* 2007; 44: 99-103. doi: 10.4103/0019-509X.38940.
9. Kent KC, Bartek S, Kuntz KM, Anninos E, Skillman JJ. Prospective study of wound complications in continuous infrainguinal incisions after lower limb arterial reconstruction: incidence, risk factors, and cost. *Surgery.* 1996; 119(4): 378-383. doi:10.1016/s0039-6060(96)80135-8.
10. Meiler LJ, Beach EC, Chavan B, Conrad-Schnetz KJ, Stanley JA, Ramon N. The benefit of negative pressure dressings in vascular surgery patients with infrainguinal incisions. *J Vasc Surg.* 2021; 74(5): 1668-1672. doi:10.1016/j.jvs.2021.04.058.
11. Metcalfe D, Sinha S, Sadek N, et al. Successful use of talc sclerodesis to control a persistent high-output groin seroma following endovascular abdominal aortic aneurysm repair. *Ann Vasc Surg.* 2013; 27(6): 801. e9-801.e12. doi:10.1016/j.avsg.2013.02.001.
12. Andrades P, Prado A. Composition of post abdominoplasty seroma. *Aesthetic Plast Surg.* 2007; 31: 514e8.
13. Klima DA, Belyansky I, Tsirlina VB, et al. Application of subcutaneous talc after axillary dissection in a porcine model safely reduces drain duration and prevents seromas. *J Am Coll Surg.* 2012; 214: 338e47.
14. Shermak MA, Yee K, Wong L, et al. Surgical management of groin lymphatic complications after arterial bypass surgery. *Plast Reconstr Surg.* 2005; 115: 1954e62.

15. Janis JE, Khansa L, Khansa I. Strategies for Postoperative Seroma Prevention: A Systematic Review. *Plast Reconstr Surg.* 2016; 138(1): 240-252. doi: 10.1097/PRS.0000000000002245. PMID: 27348657.
16. Papanikolaou A, Minger E, Pais MA, Constantinescu M, Olariu R, Grobbelaar A, Lese I. Management of Postoperative Seroma: Recommendations Based on a 12-Year Retrospective Study. *J Clin Med.* 2022; 11(17): 5062. doi: 10.3390/jcm11175062. PMID: 36078992; PMCID: PMC9457167.
17. Al Daoud F, Thayer A, Sachwani Daswani G, Maraqa T, Perinjelil V, Mercer L Jr. Management of chronic abdominal wall seroma with Doxycycline sclerotherapy using a Negative Pressure Wound Therapy System KCI-V.A.C.Ultra™-A case report. *Int J Surg Case Rep.* 2018; 51: 25-28. doi: 10.1016/j.ijscr.2018.08.014. Epub 2018 Aug 13. PMID: 30130670; PMCID: PMC6104591.
18. Mazza M, Sommariva A. Indocyanine green-enhanced fluorescence-guided video-assisted axillary surgery for chronic lymphocele. *Asian J Endosc Surg.* 2019; 12: 492-494. <https://doi.org/10.1111/ases.12662>
19. Throckmorton AD, Askegard-Giesmann J, Hoskin TL, et al. Sclerotherapy for the treatment of postmastectomy seroma. *Am J Surg.* 2008; 196: 541-4.

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