A Review Of Strategies For Preventing And Managing Seroma Formation Following Groin Procedures

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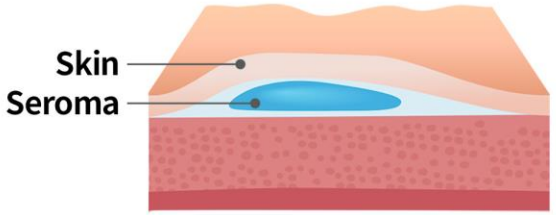
Background

Groin exploration surgery, commonly performed for hernia repair, lymph node dissection, and vascular intervention, often results in seroma formation due to disruption of lymphatic vessels. Seromas are typically self-limiting but occur in up to 50% of cases. They may cause discomfort, wound dehiscence, infection, and prolonged hospital stays. Seromas can require multiple operations and possible muscle flaps. The prevention of seromas remains difficult to address. This study presents a comprehensive literature review addressing seroma prevention and management.



Methods

42 papers were selected for relevance using the keywords:

- "seroma formation and groin surgery"
- "seroma prevention"

All paper types and surgical specialties included

- general surgery, plastic surgery, and vascular surgery

Inclusion/Exclusion criteria

- Inclusion: all papers that discussed prevention and management techniques for seroma from 1995-2024
- Exclusion: none
- Data subdivided into preventative measures and post-operative management

Results

Technique	Reduction in Seroma Formation	Type of Study	Sample Size (total;treatment)
Doxycycline	87.94%	Retrospective	N=38
		Case Report	N=1 case report
Porcine Dermal Collagen (Permacol™)	46.17%-86.88%	RCT Animal	N=18;6
Quilting Sutures	13.0%-56.0%	RCT Human	N=108;54
		Prospective	N=27;11
		Observational	N=82;41
Talc Sclerodesis	18.1-33.0%	Clinical Trial	N=180;74
		Comparative Animal	N=6
		Case Report	N=2 case reports
Incisional Negative Wound Pressure Therapy (iNWPT)	6.3%-44.4%	Ex Vivo Experimental	N = 1
		Retrospective	N=151;73
		Case Report	N= 2 case reports
Fibrin Tissue Sealant Adhesives	0.17%-37.5%	RCT Human	N=32;16
		Systematic Review	N=6 RCT studies
Lymphatic Ligation	12.00%	RCT Human	N=201;101

Jadhav, Gauri & Adhikari, Geet & Purohit, Rajashree. (2022). A Prospective

Conservative

- Elevation
- Compression
- Bed rest
- Prophylactic antibiotics

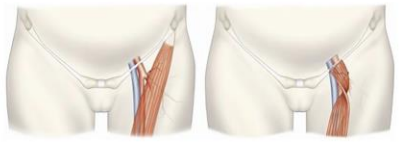
Larger seromas

- Aspiration(s)

OR Take Back

Sterile vs. Infected Seroma

- OR take back considered if there is a need for:
  - Extra anatomical vs. autologous in situ bypass
  - Seroma evacuation
    - Surgical drainage
  - Application of sclerosing agents
  - Surgical creation of a muscle flap to cover the cavity and blood vessels/graft



Price A et al. The use of vascularized muscle flaps for treatment or prevention of wound complications following arterial surgery in the groin. Int Wound J. 2020.

Conclusion

Seroma formation is common following femoral artery exposure and can lead to complications if not addressed.

Techniques that can be utilized to prevent seroma complications include:

- Prevention:
  - Quilting suture during closure, porcine dermal collagen, and doxycycline + using iNWPT dressing
- Management:
  - Infected vs. sterile

Practices from other surgical disciplines can certainly be applied in vascular surgery

Future research should aim to refine these methods and develop consensus guidelines for seroma prevention and management in vascular surgery.

References

1.Jadhav GS, Adhikari GR, Purohit RS. A Prospective Observational Study of Ventral Hernias. Cureus. 2022 Aug 21;14(8):e28240. doi: 10.7759/cureus.28240. PMID: 36158325; PMCID: PMC9489227.
2.Price A, Contact or U, White R, Williams I. The use of vascularised muscle flaps for treatment or prevention of wound complications following arterial surgery in the groin. Int Wound J. 2020 Dec;17(6):1669-1677. doi: 10.1111/iwj.13449. Epub 2020 Aug 3. PMID: 32744430; PMCID: PMC7949366.
3.Metcalfe D, Smith S, Sadek N, Hoad L, Karthikesalingam A, Jones KG, Hinchliffe RJ, Thompson MM, Black SA. Successful use of talc sclerodesis to control a persistent high-output groin seroma following endovascular abdominal aortic aneurysm repair. Ann Vasc Surg. 2013 Aug;27(6):801.e9-801.e12. doi: 10.1016/j.avsg.2013.02.001. Epub 2013 May 24. PMID: 23711974.
4.Fawzy A, Balbaa MA, Gaber A. Role for fibrin glue (sealant) in seroma reduction after inguinal lymphadenectomy: a randomized controlled trial. Int J Surg. 2021 May;89:105950. doi: 10.1016/j.ijsu.2021.105950. Epub 2021 Apr 19. PMID: 33887492.
5.Sexton R, Healy D, Keelan S, Alzarawi M, Naughton P. A systematic review and meta-analysis comparing the effectiveness of negative-pressure wound therapy to standard therapy in the prevention of complications after vascular surgery. Int J Surg. 2020 Apr;76:94-100. doi: 10.1016/j.ijsu.2020.02.037. Epub 2020 Mar 3. PMID: 32142903.
6.Weldrick C, Basharat K, O'Sullivan TA, Gillis E, Clarke Moloney M, Tang TY, Walsh SR. A comparison of fibrin sealant versus standard closure in the reduction of postoperative morbidity after groin dissection: a systematic review and meta-analysis. Eur J Surg Oncol. 2014 Nov;40(11):1391-8. doi: 10.1016/j.ejso.2014.07.034. Epub 2014 Jul 27. PMID: 25125341.
7.Valença-Filipe R, Martins A, Silva Á, Vasconcelos LO, Amarante J, Costa-Ferreira A. Dissection Technique for Abdominoplasty: A Prospective Study on Scalpel versus Diathermocoagulation (Coagulation Mode). Plast Reconstr Surg Glob Open. 2015 Feb 6;3(1):e299. doi: 10.1097/GOX.0000000000000222. PMID: 25674380; PMCID: PMC4323403.
8.Titley OG, Spyropoulos GE, Fatah MF. Preventing seroma in the latissimus dorsi flap donor site. Br J Plast Surg. 1997 Feb;50(2):106-8. doi: 10.1016/s0007-1226(97)91321-7. PMID: 9134526.
9.Svensson S, Monsen C, Kölbel T, Acosta S. Predictors for outcome after vacuum assisted closure therapy of peri-vascular surgical site infections in the groin. Eur J Vasc Endovasc Surg. 2008 Jul;36(1):84-9. doi: 10.1016/j.ejvs.2007.12.020. Epub 2008 Mar 4. PMID: 18294875.
10.Schwartz MA, Schaerer H, Sladkey M, Hairov M, Stein J. A comparison of conservative therapy and early selective ligation in the treatment of lymphatic complications following vascular procedures. Am J Surg. 1995 Aug;170(2):206-8. doi: 10.1016/s0002-9610(99)80287-6. PMID: 7631932.