Risk of post-vasectomy infection using non-sterile gloves: A retrospective audit of 4785 office-based procedures

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ABSTRACT

Introduction: The use of sterile gloves in minor outpatient procedures, including vasectomy, remains debated. Performing vasectomies without sterile gloves may lower costs, shorten operative time, and reduce medical waste — important factors for efficiency and sustainability in high-volume practices. We evaluated the risk of post-vasectomy infection in a large cohort of patients who underwent no-scalpel vasectomy performed without sterile gloves.
Methods: We conducted a retrospective review of all vasectomies performed by four physicians using non-sterile gloves from January 1, 2024, to March 31, 2025, across four Canadian outpatient clinics. Infection was defined as an antibiotic prescription within 30 days post-vasectomy recorded in the electronic medical record. We also assessed the effect of attending physician, use of skin glue for wound closure, and appointment duration. Differences were analyzed using Fisher's exact test with Bonferroni-corrected significance set at $p<0.017$.
Results: Among 4785 vasectomies, four patients (0.08%, 95% confidence interval [CI] 0.03–0.2%) received antibiotics. No significant differences in infection risks were found between physicians (0.08% [2/3, 798], 0.13% [1/756], 0.93% [1/107], 0% [0/124]; p=0.07). Risks were also similar with vs. without skin glue (0.03% vs. 0.3%, p=0.04) and with short (<15 minutes) vs. longer (>30 minutes) appointment durations (0.07% vs. 0.4%, p=0.18).
Conclusions: Post-vasectomy infection risk with non-sterile gloves was very low. These findings support the use of non-sterile gloves for office-based no-scalpel vasectomy. Multicenter,

prospective studies are warranted to confirm these findings across diverse clinical settings. Further research should evaluate additional measures, such as skin glue, to reduce infection risk.

INTRODUCTION

The use of sterile gloves when performing vasectomy, a minor outpatient surgical procedure most often practiced in office -based setting, has long been standard practice. However, six recent systematic reviews published between 2020 and 2024 provide a strong and consistent body of evidence that nonsterile gloves do not increase the risk of postoperative infection in minor surgical,[1–3] dermatologic,[4] or wound repair[5,6] procedures.

One study published in 2023 reported similar results in vasectomy.[7] This large multicenter retrospective study including 133,044 no-scalpel vasectomies (NSV) performed in Canada, Colombia, New Zealand, and the United Kingdom found an overall risk of post-vasectomy infection of approximately 1%, with variation between sites (0.8%–2.1%). In the 10,056 NSV performed in New Zealand, there was no statistically significant difference in the risk of infection with (0.9%) and without (1.3%) sterile gloves.

Based on the available evidence, in January 2024, we decided to use only nonsterile gloves for performing vasectomy in our network of four clinical sites in the provinces of Ontario and Quebec, Canada. The objective of our study, an audit of our practice, was to determine the risk of post-vasectomy infections since we adopted the use of non-sterile gloves during vasectomy. We also explored the effect of the physician performing the vasectomy, the use of glue to close the wound, and the time allocated for the procedure on the risk of infection.

METHODS

We conducted a retrospective audit of routine clinical practice using analytic tools within our electronic medical record (EMR), the Collaborative Health Record by Telus Health. We included all vasectomies performed between January 1, 2024 and March 31, 2025 in our four outpatient clinics: Ottawa and Hawkesbury in Ontario, and Gatineau and Montreal in Quebec, Canada. These were performed by four physicians (JPB, VD, MSC, DT) with different levels of experience with vasectomies and working in the different clinics. In accordance with the Tri-Council Policy Statement: Ethical Conduct for Research Involving Humans (TCPS 2), this project met criteria for quality assurance and quality improvement activities and therefore did not require formal research ethics board review.[8]

All procedures were performed with the physician wearing a mask, surgical cap and non-sterile gloves (nitrile or vinyl). Patients were instructed to shave preoperatively; if not done, as needed, shaving was performed at the time of the surgery. Skin antisepsis was done with 70% isopropyl alcohol prior to No-needle (MadaJet) anesthesia, followed by three applications of Stanhexidine® (2% chlorhexidine with 4% isopropyl alcohol). Stanhexidine® was also sprayed and rubbed on nonsterile gloves. Sterile instruments (autoclaved), drapes, and gauze were used.

Wound closure included a sterile gauze, with optional glue (2-octyl cyanoacrylate) in the Ottawa site, and the Hawkesbury site after January 1, 2025. Surgeons isolated and delivered the vas deferens with the NSV technique in all vasectomies. Once the vas deferens was delivered, they performed mucosal thermal cauterization to the abdominal end of the vas and then divided the vas. A titanium clip was subsequently used to perform fascial interposition over the abdominal end, while the testicular end was left open without excising a segment.

We defined infection as any prescription for antibiotics within one month after vasectomy. All prescriptions were identified through the EMR review. Using the analytics function of the EMR, two authors (JPB and ML) independently searched for all vasectomized patients during the study period and cross-matched them with those who had the mention in their record of any antibiotic prescribed by the attending surgeon or by any other physician. We determined certainty of infection based on the attending physician's assessment (classified as high for "certain" or "probable," and low for "possible") or on documented signs, symptoms, and timing.[7] Fever, scrotal abscess, severe or worsening moderate scrotal pain accompanied by skin edema and erythema, and urinary symptoms within the first week after vasectomy indicate a high probability of infection.[7]

We conducted three assessments to appraise the internal and external validity of the data collected in our database. First, among all men vasectomized during the study period, we searched our EMR for all those who returned for an in-person follow-up after their vasectomies, and the reason for the post-op visit.

Second, we collected information on patients who contacted our offices for a clinical concern - either by phone or through our EMR direct messaging system - over two distinct periods totaling 67 days (July 17 to August 17 and September 3 to October 7, 2025). For each contact, we recorded the date of vasectomy, reason for the call, and the management provided. Our clerical staff followed clinic-established guidelines to triage patients. Specifically, if the complaint involved a scrotal mass the size of a kiwi or larger, the patient was scheduled for an in-person consultation with a physician. For smaller masses, patients were advised to avoid manipulating the area, apply ice, and take acetaminophen and ibuprofen, with medical follow-up if symptoms worsened. In cases of acute tenderness without other signs of infection (increasing swelling or pain, redness, skin thickening, or fever), they recommended rest, ice, acetaminophen, and ibuprofen, again with follow-up if symptoms progressed. If any infection sign was reported by the patient, an appointment with a physician was scheduled. Patients reporting chronic pain were also booked for in-person evaluation. We also identified in the EMR men vasectomized during this period, and those who returned for an in-person follow-up and for what reasons. The objectives were to estimate how many required an in-person follow-up with a physician and for what reason, and to compare these results with those from the complete studied cohort.

Third, among all men vasectomized during the study period, we selected a random sample of 313 without identified infection. Selected patients were contacted by telephone and asked whether, since their vasectomy, they had consulted a health care professional either in

person or by phone. If they answered yes, we collected details regarding the presenting symptoms, the diagnosis (if known to them), and the interventions, (including antibiotics) provided to resolve their symptoms (questionnaire in supplementary material). We calculated that if no infection was identified in this sample, we had a 97.5% probability that the true probability of infection was under 1.5%.[9]

We calculated the risk of infection with 95% corrected binomial confidence interval (CI).[9] We compared infection risk between surgeons who performed vasectomy, patients who received glue vs. those who did not, and between appointments scheduled 15 minutes or less vs. 30 minutes or more (a surrogate of exact measure of procedural duration) using Fisher's exact test.[10] As three comparisons were performed, a Bonferroni correction was applied resulting in a p value <0.017 (0.05/3) considered as statistically significant.[11]

RESULTS

We performed 4,785 vasectomies on 4,781 men during the study period; 4 men had a repeat vasectomy for occlusive failure identified with post-vasectomy semen analysis. Table 1 describes the characteristics associated with the vasectomies studied. Most surgeries were performed by the most experienced vasectomist in three of the four locations. The two surgeons with less volume allocated more time to the appointment for the surgery.

Among the 4,785 vasectomies, we identified four (0.08%, 95% CI: 0.03% to 0.2%) with infections. All were first vasectomies. Their characteristics are described in Table 2. All occurred within 14 days of vasectomy. Three of the four surgeons had at least one patient in whom antibiotics was prescribed. Three of the four cases were considered having had a low certainty of infection. No patient had risk factors. No abscess was encountered.

The difference in infection risk between physicians was not statistically significant: 0.08% (2/3,798), 0.13% (1/756), 0.93% (1/107), and 0% (0/124); p=0.07. Nor was the use of glue (1/3,728 [0.03%] vs. 3/1,057 [0.3%]; p=0.04) and the time allocated for the appointment (3/4554 (0.07%) vs. 1/231 (0.4%); p=0.18).

Table 3 present the frequency of contacts for post-vasectomy clinical concerns, and in-person visits and their diagnoses in the complete studied cohort and the two validation samples. The frequency of clinical contacts for post-vasectomy clinical concerns was unavailable for the complete studied cohort but was similar (5.1%) for both validation samples. The proportions of patients who had an in-person visit for a clinical concern and the distribution of diagnoses, including risk of infection (0.2%, 95% CI 0.01% to 1.2%), were similar in the complete studied cohort and in the prospective review of contacts suggesting complete retrieval of infection cases from the EMR in the studied cohort.

The proportion of patients who had an in-person visit was however higher in the random sample of patients. About half (9/16) did not contact our clinics for clinical triage and eight of these had an in-person consultation with other health services related to a post-vasectomy clinical concern. One patient reported an infection (0.3%, 95% CI 0.02% to 2.1%). If we hypothetically apply the risk of infection observed in the random sample to the studied cohort

((1/313) x 4785), 15 infections could have been missed. If this were the case, the risk of infection in the studied cohort would be 0.4% ((15+4)/4785) with a 95% CI 0.3% to 0.6%.

DISCUSSION

Our study shows that in our outpatient settings the risk of post-vasectomy infection is very low when non-sterile gloves are used. This align with all systematic reviews showing that non sterile gloves are not necessary to prevent infections in minor surgical[1–3] or dermatologic[4] procedures, and wound repair[5,6]. Our findings are also coherent with the results reported by Lawton et al.[7] who observed no statistically significant difference in the risk of infection between NSV performed with sterile gloves (0.9%) and those without (1.3%) in a cohort of 10,056 patients from New Zealand.

Our observed risk of post-vasectomy infection (0.08%) was lower than that reported in previous studies. The risk of infection commonly cited in practice guidelines varies from 0.2% to 1.5%[12,13] to 1% to 2%[14,15] with lower risks observed with NSV. The risk of infection reported in large series of NSV performed in Canada are 0.2% to 0.5%[16] and 0.8%[7], in New Zealand 1%[7], in United Kingdom 1.2%[16] to 1.3%[7], and in Colombia 2.1%[7]. Several hypotheses may explain our results. First, our standardized sterile preparation technique, which includes a triple pass of a chlorhexidine-alcohol solution and rubbing the nonsterile gloves with the same solution, may very effectively reduce bacterial load, offsetting any potential benefit attributable to sterile gloves. Our antisepsis protocol may act as a confounding factor when comparing our infection rates with those reported in other studies using different skin preparation and glove handling practices. Second, the high procedural volume and technical consistency of our surgical team may also play an important role. Most vasectomies were performed using a uniform NSV technique by experienced surgeons who adhere to standardized and efficient steps. Third, our postoperative triage and management protocols may have contributed to avoiding unnecessary antibiotic use, thereby reducing diagnosis of infection. Given the high volume of vasectomies performed globally each year, even modest reductions in antibiotic use may translate into public health benefits by limiting antibiotic exposure and the development of antimicrobial resistance. Strengths of our study are its large sample size and validation assessment conducted. The results from data extracted from our EMR, the prospective audit of patient contacts, and the telephone survey of a random sample of patients were coherent. The proportion of patients who contacted us for clinical concerns, identified both in the prospective audit and random sample follow-up, was about 5%. Between 1.3% and 3.2% attended an in-person visit after their vasectomy. These proportions are within the ranges reported earlier with NSV.[16,17]

Our study also has limitations. The low infection risk observed may be explained by measurement bias. The retrospective review of antibiotic prescriptions documented in an EMR may underestimate the true risk of infection. Although two independent investigators searched the database, cases may have been missed. However, our prospective assessment of clinical concerns and in-person visit suggests that all cases were retrieved in the EMR.

As shown in the validation performed on a random sample of our studied cohort, some patients have sought care in their community, not contacting our vasectomy clinics. However, even if some infections were missed, our estimates of infection risk with nonsterile gloves are certainly not larger than those reported with sterile gloves. The risk of infection in the primary analysis and those measured in the prospective validation of patient contacts and random sample were comparable (all under 0.3%) with 95% CI overlapping. The upper limit of the 95% CI of the three estimates measured in our study (0.2%, 1.2%, and 2.1%) are within the risks observed in other studies reporting on infection with NSV performed with sterile gloves.[7,16,17] Even if we add the missed infection cases estimated from the random sample and the cases retrieved in the EMR, our hypothetical infection risk (0.4%, 95% CI 0.3% to 0.6%) remains also well under the risk reported with sterile gloves. Moreover, our low estimate of risk of infection may even be an overestimation of true infection. Only one of our four cases (25%) met criteria for high-certainty infection. Similarly, Lawton at al.[7] reported that approximately 40% of infections in Canadian and New Zealand cohorts were classified with high diagnostic certainty.

We explored the association between three factors (surgeon, use of glue, and time allocation for the appointment) and the risk of post-vasectomy infection. We did not observe any significant association. Although a trend with the use of glue was observed, further studies would be necessary to assess the role of this factor for preventing infection. Use of glue may create a barrier effect against external contaminants. However, the use of a topical antibiotic ointment which could potentially play a similar role has not been found to reduce the risk of infections.[7] Beyond clinical safety considerations, the use of non-sterile gloves for vasectomy may offer meaningful practical advantages. Eliminating the use of sterile gloves reduces procedural costs, as sterile gloves are significantly more expensive than clean, non-sterile examination gloves. This cost difference becomes substantial in high-volume vasectomy practices, where thousands of procedures are performed annually. In addition, the time required to open sterile glove packs is eliminated, streamlining room turnover and allowing more procedures to be completed within the same clinical schedule. This increased efficiency translates into greater overall productivity for providers. Finally, avoiding sterile glove packaging and associated materials also reduces medical waste, contributing to a smaller environmental footprint. These cumulative benefits—lower cost, shorter procedure time, and reduced waste—support the potential sustainability and scalability of performing vasectomies safely with non-sterile gloves in outpatient settings.

CONCLUSIONS

Risk of post-vasectomy infection was very low in this large cohort despite the use of non-sterile gloves. Our findings support the use of non-sterile gloves for office-based no-scalpel vasectomies. Multicenter prospective studies are warranted to validate these findings across different clinical settings and healthcare systems. Studies on interventions such the use of skin glue for further preventing post-vasectomy infection should be conducted.

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FIGURES AND TABLES

Table 1. Characteristics of the 4785 no-scalpel vasectomies in the study

Surgeon	Specialty	Experience of surgeon (number of vasectomies)	Location of surgery	Minutes allocated for appointment	Number of vasectomies studied	Use of skin glue
1	FP	~20 000	Ottawa	10	2767	Yes
			Hawkesbury	10−15	938	Yes (132)/No (806)
			Gatineau	15	93	No
2	GS	~1000	Ottawa	15	683	Yes
			Hawkesbury	15	73	Yes (22)/ No (51)
3	FP	~1000	Montreal	30	107	No
4	GS	~100	Ottawa	30−45	124	Yes

FP: family physician; GS: general surgeon.

Table 2. Characteristics of vasectomies with post-vasectomy infection										
Case	**Surgeon**	**Time post-op (days)**	**Location of surgery**	**Certainty of infection**	**Antibiotic prescribed**	**Physician who prescribed**	**Minutes allocated for appointment**	**Skin glue**	**Risk factor**	**Comments**
1	1	10	Hawkesbury	Low	Levofloxacin	1	15	No	No	Hematoma
2	3	10	Montreal	Low	Levofloxacin	3	30	No	No	
3	1	14	Hawkesbury	High	Levofloxacin	1	10	No	No	Infectious epididymitis
4	2	3	Ottawa	Low	Ciprofloxacin	ER	15	Yes	No	Hematoma. No signs of infection 9 days post-op

ER: emergency room.

Table 3. Frequency of contacts for post-vasectomy clinical concerns, in-person visits, and diagnoses according to sample assessed			
Post vasectomy concerns, visits, and diagnoses	**Studied cohort (n=4781)** **n (%)**	**Validation by prospective review of contacts (n=545)** **n (%)**	**Validation on random sample (n=313)** **n (%)**
Contact for clinical concerns	Unknown	28 (5.1)	16 (5.1)*
In-person visits	61 (1.3)	7 (1.3)	10 (3.2)
Infection	4 (0.1)	1 (0.2)	1 (0.3)
Hematoma without infection	7 (0.1)	1 (0.2)	1 (0.3)
Acute pain without infection (within 1 month)	13 (0.3)	2 (0.4)	1 (0.3)
Subacute or chronic pain	34 (0.7)	2 (0.4)	5 (1.6)
Others concerns	3 (0.1)	1 (0.2)	2 (0.6)

*Managed by phone (5 at our clinics and 1 in community health center) or in-person (2 at our clinics, 2 in emergency room, and 6 by their family physician).