

# Comparison of buried continuous intradermal and simple interrupted suture patterns for skin closure in feline ovariohysterectomy

Leaw Yi Xin<sup>1,2</sup>, Deni Noviana<sup>3</sup>, Usamah Afiff<sup>4,\*</sup>

<sup>1</sup> Program of Veterinary Medicine, School of Veterinary Medicine and Biomedical Sciences, IPB University, Bogor, Indonesia

<sup>2</sup> Foon Yew High School, Johor Bahru, Johor Darul Ta'zim, Malaysia

<sup>3</sup> Division of Surgery and Radiology, School of Veterinary Medicine and Biomedical Sciences, IPB University, Bogor, Indonesia

<sup>4</sup> Division of Medical Microbiology, School of Veterinary Medicine and Biomedical Sciences, IPB University, Bogor, Indonesia

**ABSTRACT:** Ovariohysterectomy is widely performed in small animals and is often complicated by wound dehiscence. This study evaluated two suture techniques, buried continuous intradermal (BCID) and simple interrupted (SI), in 42 female cats using nonabsorbable nylon sutures. Weight, incision length, suture length, and closure time were also analysed. Postoperative assessments at 18-24 h and 5-7 d included monitoring for swelling, erythema, exudate, and dehiscence. The results indicated a significantly higher incidence of complications, notably dehiscence, in the SI group. Consequently, BCID is recommended because of its lower complication rate and reduced risk of infection from self-trauma.

## Keywords:

ovariohysterectomy, continuous intradermal, simple interrupted, feline, skin closure

## INTRODUCTION

Gonadectomy is one of the most frequently performed surgeries in veterinary practice because of its numerous benefits, such as controlling stray populations, reducing hormonally driven behaviours, and lowering the risk of reproductive diseases, such as pyometra and mammary neoplasia in female animals (DeTora & McCarthy 2011). However, this procedure carries risks, with complication rates for ovariohysterectomy in healthy dogs and cats ranging from 6% to 20%, often depending on the surgeon's skill (Burrow *et al.* 2023). Common complications include anaesthesia, haemorrhage, infection, and hernia formation (Root 2012). Cats face a higher risk of wound dehiscence owing to the fragility of sutures, underscoring the importance of using strong sutures to maintain wound integrity (Sylvestre *et al.* 2002). Notably, no studies have examined domestic cats in tropical regions such as Indonesia, indicating a gap for further research. This study aimed to improve knowledge and practices in small animal veterinary science, particularly in shelter medicine, where high-volume spray and neuter programs are essential.

## MATERIALS AND METHODS

This study included 42 healthy stray cats with no recent antibiotic or anti-inflammatory treatments that underwent surgical procedures. The surgical incisions were closed using a three-layer technique. For skin closure, cats were divided

into two groups: buried continuous intradermal (BCID) and simple interrupted (SI) suture techniques, with 4-0 nylon sutures. Each group included 21 randomly assigned domestic short-haired cats (Figure 1). The groups were comparable in terms of breed, age, weight, and length of incision. Postoperative assessments at 18-24 h and 5-7 d focused on dehiscence, swelling, erythema, and exudates (Table 1). Data were analysed using Microsoft Excel to quantify complications and assess suture technique effectiveness, providing a thorough examination of outcomes in feline surgery.

Table 1 Parameters for clinical assessment of wound healing‡

Parameters	Score			
	0	1	2	3
Swelling	None	Mild	Moderate	Severe
Hemorrhage	None	Mild	Moderate	Severe
Scab inflammatory exudate	None	Serous	Serous-sanguineous	Sanguineous
Dehiscence	None	Scant	Moderate	Copious
	None	0-20%	20-50%	>50%

Note: ‡) AbdelKhalek *et al.* 2019; Dehiscence percentage = (length of dehiscence x 100) / entire wound length (Hohenleutner *et al.* 2000).

Received: 20-10-2024 | Revised: 21-11-2024 | Accepted: 27-11-2024



Copyright © 2024 CC-BY-SA. This is an Open Access article distributed under the terms of the Creative Commons Attribution ShareAlike 4.0 International License (<https://creativecommons.org/licenses/by-sa/4.0/>).

## RESULTS AND DISCUSSION

This study revealed a notable difference in postsurgical outcomes between the two suture groups. The Buried Continuous Intradermal (BCID) group showed exemplary healing with no complications observed during the initial 18-24 h assessment or the 5-7 d follow-up. Conversely, the Simple Interrupted (SI) group experienced several issues. At the 18-24 h mark, mild erythema and minimal dehiscence were noted, affecting less than 20% of the cases. However, at the 5-7 d follow-up, complications increased significantly, including increased swelling, moderate erythema, and dehiscence, reaching up to 50% in one instance.

Statistical analysis highlighted a significant increase in dehiscence within the SI group from the initial to the later assessment ( $p = 0.03$ ), with no significant differences noted at 18-24 h compared with the BCID group. By the 5-7 d mark, the incidence of dehiscence in the SI group was significantly higher ( $p < 0.05$ ), and the wound healing scores reflected this trend, averaging 11, in stark contrast to a score of 0 in the BCID group (Table 2). Wound healing is critical for successful recovery of tissue integrity and cellular function after ovariohysterectomy (Townsend *et al.* 2017). Inadequate healing can lead to severe complications such as dehiscence, infection, and pronounced erythema. The findings of this study at the 5-7 d interval demonstrated a marked increase in complications within the SI group, including notable signs of mild swelling, erythema, and dehiscence, while the BCID group remained complication-free.

Postoperative suture tension is known to compromise tissue perfusion, elevating the risk of infection, and exacerbating pain (Höer *et al.* 2001). The SI group exhibited increased inflammation and self-trauma, likely aggravated by foreign material at the suture site and cats' natural grooming behaviours. Factors such as obesity, diabetes, infection, excessive physical activity, and suboptimal surgical techniques have also been identified as contributors to the likelihood of developing dehiscence when employing a simple interrupted suture pattern (Griffon & Hamaide 2016).

The study also underscored the challenges in stray animal management, particularly the absence of Elizabethan collars post-surgery, which complicates recovery. These findings strongly suggest that the BCID suture method, which does not require suture removal and exhibits a lower dehiscence rate, represents a more viable and effective option for managing stray animals.

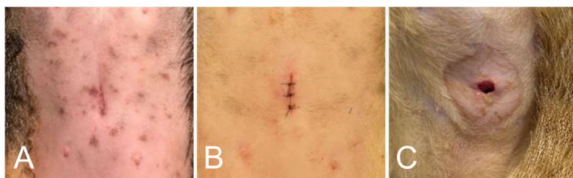


Figure 1 Suture patterns for skin closure in feline ovariohysterectomy. (A) buried continuous intradermal suture (BCID), (B) simple interrupted suture (SI), and (C) wound dehiscence with inflammatory exudate in SI at 5 to 7 days.

Table 2 Clinical assessment of wound healing after surgery

Parameters	18-24 h		5-7 d	
	BCID	SI	BCID	SI
Swelling	0	0	0	1
Erythema	0	1	0	2
Inflammatory exudate	0	0	0	2
Dehiscence	0	1	0	6
<b>Total</b>	<b>0</b>	<b>2</b>	<b>0</b>	<b>11</b>

Note: BCID=buried continuous intradermal suture, SI=simple interrupted suture.

## CONCLUSION

Despite being more time intensive, BCID has been shown to promote rapid epithelialisation, yield better cosmetic outcomes, and reduce infection risks related to self-trauma. Conversely, the SI technique is associated with a higher incidence of complications, particularly wound dehiscence within five–seven days post-operation. Consequently, BCID is preferable for skin closure in feline ovariohysterectomy, particularly when an Elizabethan collar cannot be used during recovery. BCID is particularly suitable for managing stray or community feline populations in which postoperative care resources are limited.

## AUTHOR INFORMATION

### Corresponding Author

\*UA: usamahaf@apps.ipb.ac.id

Division of Medical Microbiology, School of Veterinary Medicine and Biomedical Sciences, IPB University. Jln Agathis, IPB Dramaga Campus, Bogor, West Java, 16680, INDONESIA.

## REFERENCES

- AbdelKhalek AS, Youssef HA, Ali MF, Ali MM, Abdel Hakiem MAH, Mahmoud HFF. 2019. An assessment of clinical, biometric, cosmetic and microscopic outcomes of four suture techniques for cutaneous closure of laparotomy wounds: an experimental study in rabbits. *Journal of Dairy Veterinary & Animal Research*. 8(1):42–53.
- Burrow R, Shaver SL, Holmes JH. 2023. Outcomes of elective gonadectomy procedures performed on dogs and cats by veterinary students and shelter veterinarians in a shelter environment. *Journal of the American Veterinary Medical Association*. 253(10):1294–1299.
- DeTora M, McCarthy RJ. 2011. Commentary ovariohysterectomy versus ovariectomy for elective sterilization of female dogs and cats: is removal of the uterus necessary? *Journal of the American Veterinary Medicine Association*. 239(11):1409–1412.
- Griffon DJ, Hamaide A. 2015. Chapter 9: Dehiscence, Complications in small animal surgery. Wiley-Blackwell.
- Höer J, Klinge U, Schachtrupp A, Töns C, Schumpelick V. 2001. Influence of suture technique on laparotomy wound healing: an experimental study in the rat. *Langenbeck's archives of surgery*. 386:218–223
- Hohenleutner U, Egner N, Hohenleutner S, Landthaler M. 2000. Intradermal buried vertical mattress suture as sole skin closure: evaluation of 149 cases. *Acta Dermato Venereologica*. 80(5):344–347.
- Root Kustritz MV. 2012. Effects of surgical sterilization on canine and feline health and on society. *Reproduction in domestic animals= Zuchtthygiene*. 47(4):214–222.
- Sylvestre A, Wilson J, Hare J. 2002. A comparison of 2 different suture patterns for skin closure of canine ovariohysterectomy. *The Canadian Veterinary Journal*. 43(9):699.
- Townsend CM, Townsend JrCM, Beauchamp JrRD, Beauchamp RD, Mattox KL, Evers BM, Mattox Jr K. 2017. *Sabiston textbook of surgery*. 20th ed. Philadelphia (US): Elsevier.