

# BestBETS for Vets

Supporting veterinary clinicians in making evidence-based decisions



## Midline versus flank approach and wound complications in neutering of cats

### Clinical Scenario

Miss Tabby brings you a colony of feral cats she has trapped in her garden to be neutered. The cats cannot be handled, and will be monitored post-op by visual inspection at least ten feet away. She asks you if they can be spayed via a flank approach, so that she will be able to see the incision site more easily. However, as the cats can only be monitored from a distance, and re-trapping after surgery would be difficult, any post-operative complications would be very difficult to address and potentially a serious welfare concern. You wonder if using a flank approach will lead to more post-operative wound complications than the midline approach...

### 3-Part Question (PICO)

In [female cats that are being neutered] does a [midline surgical approach as compared to flank] [decrease wound complications following surgery]?

### Search Strategy

#### MEDLINE(R) In-Process & Other Non-Indexed Citations and MEDLINE(R) 1946 to Present using the OVID interface

(cat.mp. OR cats.mp. OR feline.mp. OR felines.mp. OR queen.mp. OR queens.mp. OR felis.mp. OR felidae.mp. OR exp Cats/ OR exp Felis/ OR exp Felidae/)

#### AND

(spey.mp. OR speyed.mp. OR spay.mp. OR spayed.mp. OR spaying.mp. OR speying.mp. OR neuter.mp. OR neutered.mp. OR neutering.mp. OR ovariectomy.mp. OR ovariohysterectomy.mp. OR hysterectomy.mp. OR sterilised.mp. OR sterilized.mp. OR sterilisation.mp. OR sterilization.mp. OR de-sex.mp. OR desexed.mp. OR desexing.mp. OR desex.mp. OR de-sexed.mp. OR de-sexing.mp. OR gonadectomy.mp. OR exp Ovariectomy/ OR exp Sterilization, Reproductive/ OR exp Hysterectomy/)

#### AND

(midline.mp. OR flank.mp. OR linea alba.mp. OR laparotomy.mp. OR coeliotomy.mp. OR celiotomy.mp. OR lateral approach.mp. OR exp Laparotomy/)

## CAB Abstracts 1910 to Present using the OVID interface

(cat.mp. OR cats.mp. OR feline.mp. OR felines.mp. OR queen.mp. OR queens.mp. OR female cat.mp. OR female cats.mp. OR felis.mp. OR felidae.mp. OR exp cats/ OR exp Felis/ OR exp Felidae/)

### AND

(spey.mp. OR speyed.mp. OR spay.mp. OR spayed.mp. OR spaying.mp. OR speying.mp. OR neuter.mp. OR neutered.mp. OR neutering.mp. OR ovariectomy.mp. OR ovariohysterectomy.mp. OR sterilised.mp. OR sterilized.mp. OR sterilisation.mp. OR sterilization.mp. OR desex.mp. OR de-sex.mp. OR desexed.mp. OR de-sexed.mp. OR de-sexing.mp. OR desexing.mp. OR gonadectomy.mp. OR hysterectomy.mp. OR exp ovariectomy/ OR exp gonadectomy/ OR exp sterilization/ OR exp hysterectomy/)

### AND

(midline.mp. OR flank.mp. OR linea alba.mp. OR laparotomy.mp. OR coeliotomy.mp. OR celiotomy.mp. OR lateral approach.mp. OR exp laparotomy/)

## Search Outcome

### MEDLINE

- 132 papers found in MEDLINE search
- 129 papers excluded as they don't meet the PICO question
- 0 papers excluded as they are in a foreign language
- 0 papers excluded as they are review articles/in vitro research/conference proceedings
- 3 total relevant papers from MEDLINE

### CAB Abstracts

- 221 papers found in CAB search
- 215 papers excluded as they don't meet the PICO question
- 0 papers excluded as they are in a foreign language
- 4 papers excluded as they are review articles/in vitro research/conference proceedings
- 2 total relevant papers from CAB

### Total relevant papers

3 relevant papers from both MEDLINE and CAB Abstracts

## Summary of Evidence

### Swaffield et al. (2020) Assume UK looking at the author list

- Title:** Prospective comparison of perioperative wound and pain score parameters in cats undergoing flank vs midline ovariectomy
- Patient group:** 75 client owned animals presented to a veterinary clinic for elective neutering
- Study Type:** Randomised controlled trial

- Outcomes:**
- Resting heart and respiratory rates, pain score at rest (FAPS score)
  - Duration of surgery and anaesthesia, intraoperative complications (including hypotension, haemorrhage, slipping of ligatures or break in aseptic technique)
  - Assessed 1 hour postoperatively and at time of discharge, at day 3, day 10 post surgery for pain and wound tenderness (FAPS score and DIVAS score), digital pressure on the site
  - Site swelling (descriptive scale used by Muir et al. and a scale unique to the study), discharge from the wound, characteristics of the discharge, periwound erythema


**Key Results:**

- 1 hour post surgery - DIVAS pain score significantly higher ( $p=0.0002$ ) in flank group. Swelling, discharge and erythema did not vary significantly between surgical approaches
- At discharge – DIVAS pain score ( $p=0.001$ ) and wound tenderness higher ( $P=0.005$ ) in flank group. Wound swelling (Muir scale) higher ( $p=0.048$ ) in midline group. Wound discharge and erythema not significantly different between groups.
- 3 day postop check – DIVAS pain score ( $p=0.05$ ), FAPS pain score ( $p=0.016$ ) and wound swelling score ( $p=0.05$ ) all significantly higher in the midline group.
- 10 day postop check – Wound swelling (Muir scale,  $P=0.001$  and VAS,  $P=0.0001$ ) higher in midline group. DIVAS score, wound discharge and erythema not significantly different between groups.
- No cats in either group were reported to have a wound breakdown or infection.

**Study Weaknesses:**

- No details about the block randomisation given
- Many of the scales used to measure wound complications not validated
- Used another study's sample size calculation to justify the number of animals recruited to the study
- There was a number of animals that dropped out in relation to the follow up assessments, particularly on day 3 (32% missing) and day 10 (53.3% missing).
- Surgeries were carried out by veterinary students and were considerably longer than would be expected from experienced practitioners
- Non-steroidal anti-inflammatory medication was only administered post-surgically, which is likely to have reduced its effectiveness
- This study concerned only ovarioectomy (OVE) and not ovariohysterectomy (OHE). It was included in the BET as they are considered similar procedures, especially in the flank approach where most attempted OVH becomes OVE with partial hysterectomy due to limited exteriorisation. However this factor should be taken into consideration when compared with studies describing OVH.

**Attachment:**

 [Evidence appraisal \(/soe\\_attachments/558/4086-Critical appraisal - Randomised Controlled Trial\\_Swaffield.pdf\)](#)

**Roberts et al. (2015) Australia**

**Title:** Effect of age and surgical approach on perioperative wound complication following ovariohysterectomy in shelter-housed cats in Australia

**Patient group:** 312 shelter cats from the Cat Protection Society of New South Wales desexing programme, identified retrospectively from their database.

**Study Type:** The authors cannot agree on what the study design is so the standard question critical appraisal sheet has been used.

**Outcomes:**

- Age of animal
- Wound complications (when the description of the surgical site in the records included the following terms; redness, swelling; heat; pain; exudation; wound dehiscence)

#### Key Results:

- Wound complications identified in 19/312 (6.09%) cases; 18 related to inflammation at the surgical site, 1 related to wound dehiscence
- Animals had a 2.95 fold increased risk of wound complication when a midline approach was used when compared to flank approach (P=0.011)
- When stratified for age, animals had a 4.59 fold increased risk of wound complication when a midline approach was used compared to a flank approach in cats up to 12 weeks of age (P=0.015). No difference was seen between the two approaches in cats over 12 weeks of age (P=0.220)

#### Study Weaknesses:

- Not enough detail given in terms of the description of the wound complications
- Cats underwent surgery at 4 different clinics; vets at one clinic carried out the flank approach and vets at the other three carried out midline approaches which is likely to have introduced bias to these results
- Statistical significance level was not stated in the methods section
- There was no justification of the sample size obtained
- Not stated whether ethical approval was sought
- Non-significant findings were not discussed

#### Attachment:

 [Evidence appraisal \(/soe\\_attachments/558/4087-Critical appraisal - Standard questions\\_Roberts\\_updated.pdf\)](/soe_attachments/558/4087-Critical appraisal - Standard questions_Roberts_updated.pdf)

### Coe et al. (2006) UK

**Title:** Comparison of flank and midline approaches to the ovariohysterectomy of cats.

**Patient group:** 66 female cats undergoing ovariohysterectomy

**Study Type:** Randomised controlled trial

**Outcomes:**

- Wound complications: discharge, excessive licking, swelling, wound breakdown

#### Key Results:

- 5/17 cats with a flank approach had mild wound discharge compared to 3/24 cats with a midline spay that developed severe swelling
- No wounds broke down, irrespective of the approach
- 3 cats with severe swelling using midline approach; none using flank approach

#### Study Weaknesses:

- Comparison of groups not presented in this paper (although is elsewhere)
- Surgeries performed by many different students, therefore may have given more complications and pain as compared to a single, more experienced surgeon

- Outcomes assessed by individual owners and highly subjective, arguably poor reliability of outcome measure

**Attachment:**

**Evidence appraisal (/soe\_attachments/558/4088-Critical appraisal - Randomised Controlled Trial\_Coe.pdf)**

## Comments

This is an updated version of the BET originally published in September 2013 and authored by Jenny Stavisky and Marnie Brennan.

The original BET included Coe et al. (2006). The appraisal of this paper has been added, and new appraisals and assessments for Roberts et al. (2015) and Swaffield et al. (2019) have been added.

There are a number of constraints to be considered when comparing these papers. These include:

- One paper described ovariectomy (Swaffield et al.) whilst the other two (Coe et al., Roberts et al.) described ovariohysterectomy
- Two studies utilised shelter animals (Coe et al., Roberts et al.) whilst one used client owned animals
- In two studies (Coe et al., Swaffield et al.) surgery was performed by students, whilst in the third (Roberts et al.) qualified veterinary surgeons performed the procedures
- In two studies (Swaffield et al., Roberts et al.) post-operative assessment was carried out by veterinary surgeons whilst in the third (Coe et al.) owner-reported outcomes were recorded

As these studies showed differences in which approach led to more complications across different time points, this suggests that other factors, such as surgeon experience, sterility and analgesia may be more important than surgical approach in determining outcomes.

## Bottom line

**There is no evidence that a flank or midline approach is consistently associated with more wound complications, and overall complication rates appear low.**

**Disclaimer**

The BETs on this website are a summary of the evidence found on a topic and are not clinical guidelines. It is the responsibility of the individual veterinary surgeon to ensure appropriate decisions are made based on the specific circumstances of patients under their care, taking into account other factors such as local licensing regulations. **Read small print (/disclaimer)**

## References

Swaffield, MJ, Molloy, SL, Lipscomb, VJ, (2019) Prospective comparison of perioperative wound and pain score parameters in cats undergoing flank vs midline ovarioectomy. *Journal of Feline Medicine and Surgery* <https://doi.org/10.1177/1098612X19837038>. (<https://doi.org/10.1177/1098612X19837038>)

Roberts ML, Beatty, JA, Dhand, NK, Barrs, VR, (2015). Effect of age and surgical approach on perioperative wound complication following ovariohysterectomy in shelter-housed cats in Australia. *Journal of Feline Medicine and Surgery Open Reports* **1**: 1-4.

Coe RJ, Grint NJ, Tivers MS, Moore AH, Holt PE, (2006). Comparison of flank and midline approaches to the ovariohysterectomy of cats. *Veterinary Record* **159**: 309-313.

## About this BET

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