

Post-operative pain scoring bitch spays: A Clinical Audit by White Lodge Veterinary Surgery, CVS

RCVS Knowledge Quality Improvement Award Champion 2024

Dr Paul David Stanley, BVM&S PGCertSAM MRCVS

Introduction

White Lodge Veterinary Surgery is a first-opinion small animal practice in Exmouth, Devon. As part of the CVS Group, we have a strong Quality Improvement (QI) ethos.

In early 2021, during a whole team practice meeting, concerns were raised about the comfort and pain management of some of our patients post-operatively. Pain should be prevented not only for ethical reasons but also due to a large range of physiological consequences including poor appetite, increased blood pressure, cytokine production, poor immune function and much more¹.

It was decided to undertake an audit to identify where we could improve the welfare and comfort of patients post-operatively. This is a vast topic with lots of potential areas to focus on and our QI Committee decided to focus specifically on pain scoring our canine and feline operations. Pain scoring was chosen as it is something routinely done post-operatively and provides a measurable score for assessing and monitoring improvements. The Glasgow Pain Scoring chart was used as it has already been validated and is used widely across the veterinary profession.

Aims of the clinical audit

The first cycle of the audit aimed to establish and quantify the baseline by pain scoring every patient one-hour post-surgery. As well as recording this we also recorded:

- All medication given before and during the procedure
- If rescue analgesia was given and if it was effective
- The type of operation
- The species and breed

This information was then used to identify groups of patients with higher pain scores. This way, we could then adapt protocols and provide training to improve the welfare of these animals. After training and new protocols were adopted, we aimed to re-audit the data to check if we had improved our pain scores.

Actions

A clinical meeting was held before the audit began to discuss the audit design. This allowed any concerns to be raised, so it could be tailored to suit everyone’s needs. The first initial meeting led to the design of the auditing data collection sheet to ease any concerns about increased paperwork.

Species: Dog Cat **Breed:**.....

Age: <=1 1 <=4 4<=8 8<=12 12<

Operation: Spay Castration Dental

Abdominal surgery Lump Removal Other

Please list or circle drugs given for premedication, induction and maintenance (I.e medetomidine, methadone, buprenorphine, paracetamol, ACP, Ketamine, meloxicam, propofol, alfaxan, paracetamol, atipamezole, lidocaine, bupivacaine, Iso & sevo)

Pain scoring result one hour post recovery	Was rescue analgesia needed?	What rescue analgesia was given?	Was rescue analgesia effective
	YES/NO		YES/NO

Figure 1: Audit data collection form

The RCVS Knowledge audit template was used to plan the audit, and the veterinary clinical audit cycle diagram was used to ensure a complete cycle was done each time. These resources aided the audit design and ensured the creation of useful and actionable data.

The practice head of Quality Improvement championed the project to ensure there were always enough audit forms present for teams to fill in each morning, which were attached to the patient's admission forms. During the second stage of the audit which focused on bitch spays, these procedures were labelled on the practice management system to ensure inclusion.

Pain scoring using the Acute Pain Assessment Scale available from Animalcare² was already standard practice post-operation. This is based on the University of Glasgow Composite Measure Pain Scale.

Before the audit began, in-house CPD was undertaken to ensure all team members were comfortable performing it. All anaesthetic charts had a pain scoring chart clipped to them to aid correct scoring and an audit data collection form to aid and simplify data collection. These two documents were used to standardise results and maximise the recording of accurate results.

As a result of the data collected and analysed during the first audit, we decided to improve existing practice protocols for all operations, focusing mainly on the ones with reported higher pain scores.

A CPD day was organised for the clinical team with an external Diplomat, European College of Veterinary Anaesthesia and Analgesia. She was invited to look at our practice protocols and design some CPD around improvements we could make. Both the vets and nurses were excited about the idea of a CPD day in practice. Having it held in the practice increased accessibility as there was no need to travel. The clinical team were then invited to come up with the intervention to ensure everyone was involved and happy with the choice made. A meeting was held where it was decided we would start using lidocaine in addition to our current protocols. The CPD provided involved various training methods on the use of lidocaine from a line block to a splash block.

As an additional note, during the second stage of the audit to review the effectiveness of our intervention, a decision was made to change the bitch spay technique to Ovariectomy after a vet presented a review paper to a clinical meeting showing Ovariohysterectomy's are more complicated, time-consuming, and is probably associated with greater morbidity³. In response, we adjusted the audit to contain three groups for correct analysis:

- **Audit Group 1** was bitch spays in the pre-intervention stage of the audit with the following protocol: premedication of medetomidine and methadone, meloxicam given during prep, alfaxalone induction, maintained on sevoflurane and an ovariohysterectomy was performed.
- **Re-audit Group 2** were included in the re-audit phase. These had the same surgical technique and anaesthetic protocols as Group 1 with the addition of Lidocaine.
- **Re-audit Group 3** were included in the re-audit phase, but with a concurrent change to the surgical technique occurring during the re-audit phase. These had the same protocols as Group 2 but an ovariectomy was performed instead of an ovariohysterectomy.

The full protocols for each group can be found in Annex 1. These groups were then analysed to check for a reduction in pain scores.

Results

In the first stage of the audit, 207 operations were analysed between March 2021 and January 2022. This accounted for 40% of the operations in the practice during this period.

The results of the first audit showed:

- 10.4% of operations received rescue analgesia but only 8.8% were over the pain score cut-off (6 or above).
- 11% of dogs were over the threshold and only 2% of cats were.
- 10% of spays needed rescue analgesia.
- When spays were separated into canine and feline, it was found that 24% of bitch spays needed rescue analgesia.
- The final three categories (castrations, dentals and lump removals) were all below 10%.

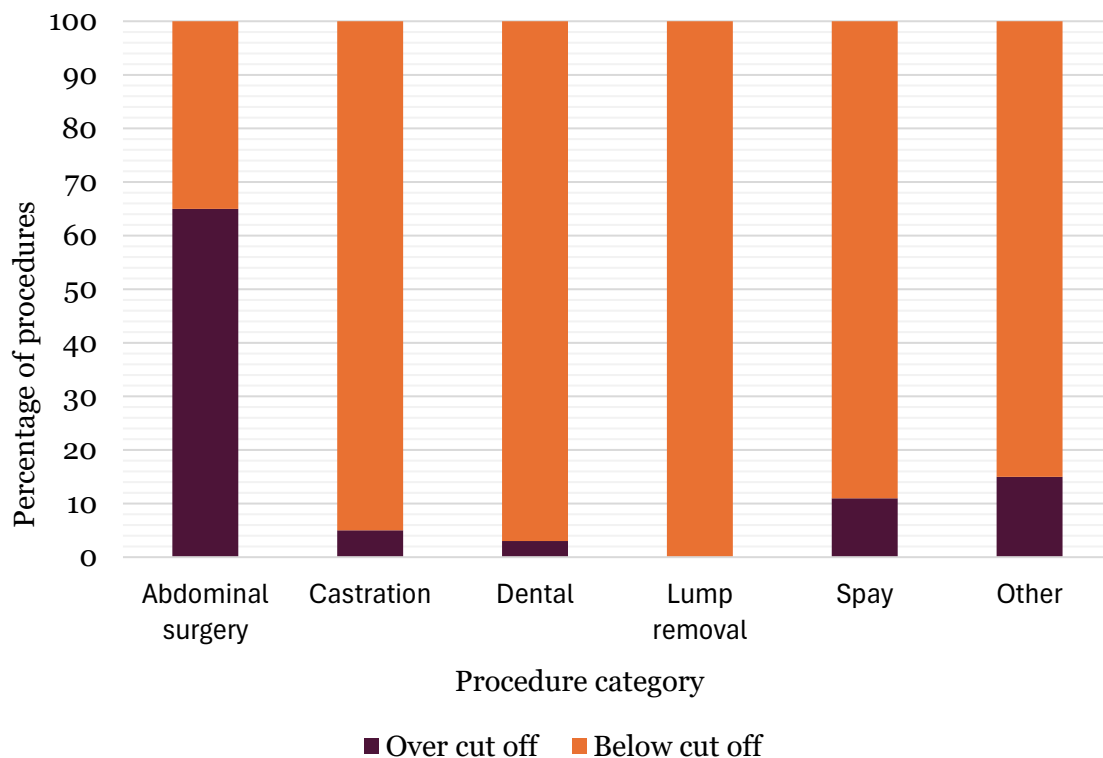


Figure 2: Chart showing the overall results of the first audit cycle, including the types of procedures where the pain score threshold was exceeded

Following team discussions, a review of existing protocols and the provision of external CPD, new dosing charts for lidocaine were created and placed in the prep room to increase familiarity with the new protocol, ensuring safe dosing and encouraging use. All vets were involved in the CPD and the design of the new practice protocol to encourage confidence and uptake.

Post-operative pain scores were then monitored to see if there was any improvement. This re-audit phase focused on bitch spays to identify improvements in the updated protocols across the three groups. The results indicated that adding lidocaine to our practice protocols showed improvement in our bitch spay pain scores.

The percentage of dogs over the pain-scoring threshold dropped from 24.2% of dogs in the pre-intervention Group 1 to:

- 18.9% in Group 2
- 10.3 % in Group 3

The average pain scores also reduced from 2.94 in the pre-intervention Group 1 to:

- 2.86 in Group 2
- 2.52 in Group 3

Bitch Spay Results	Number of operations	Number over threshold	Percentage over the threshold	Average Pain score
Audit Group 1 (pre intervention) Ovariohysterectomy no lidocaine	62	15	24.2%	2.935
Re-audit Group 2 Ovariohysterectomy plus lidocaine	37	7	18.9%	2.86
Re-audit Group 3 Ovariectomy plus lidocaine	29	3	10.3%	2.517
Group 2 & 3	66	10	14.6%	2.6885

Figure 3: Table showing the reduction in patients over the pain-scoring threshold by group

Lidocaine was also added to abdominal surgeries and other surgeries which did not fall into a category, but there was not enough data to conclude whether there was any statistically significant improvement

Impact of intervention

One of the barriers in introducing the audit is convincing the team this is not going to be a large increase to their workload. Using pain scoring as the measure was helpful as it was something team members were already doing so they did not have to do additional monitoring. The data collection sheets for the audit were designed to reduce any additional paperwork to a minimum by using tick boxes to limit the amount of writing.

Sharing the results at each stage of the audit kept teams involved and informed with what was going on and there was a genuine interest in the data uncovered. Following the sharing of results from the first stage, it was important to involve all clinical teams in planning the intervention methods used to help improve our pain scores in bitch spays. It had to be a technique that everyone believed in and was comfortable doing to ensure success. Key to this was having all clinical team members present at the CPD day in the practice and involved in the changes in the practice protocol.

The audit and interim updates have been presented on a number of occasions in regional meetings, with other practices requesting a copy of our protocols and what we have learnt from our CPD. This has included sharing our doses for drugs and also methods on how they can do the audit themselves. The local practices have been very keen to find out if lidocaine improved our pain scores and are going to try it themselves.

The audit in full will also be included in the CVS Clinical Improvement Hub as an example and template. This will then be used to aid and inspire other practices within the company to do an audit themselves or use it as a base to create their audit tailored to the individual needs of their practice.

We have extended invitations to leaders in other practices within the CVS group to join our Quality Improvement meetings which are inclusive (clinical and non-clinical teams) to help promote and share our values and principles for Quality Improvement.

Sometimes the QI methods can show uncomfortable results that can lead to difficult questions within the clinical team. During the first stage of the audit, early on it was noted that 25% of pain scores over the cut-off threshold were not getting rescue analgesia. In a clinical meeting, this was discussed within the team and a range of reasons why proposed, including that the patient was anxious meaning they believed this was falsely inflating the pain score and concerns over opioid dysphoria. It was very important to approach this meeting from a perspective of understanding and learning to allow for an open meeting to find the cause and

potential solution. We decided as a team that we should cover these animals anyway with top-up analgesia as it couldn't be quantified if they were painful or not. Regarding dog's sensitive to opioid dysphoria as a reason not to give top-up pain relief, we discussed alternatives that we could use that do not cause opioid dysphoria such as paracetamol off-licence in dogs. Without collecting the data for the audit there would have been no way of knowing the scale of patients potentially missing out on rescue analgesia which was an unexpected finding.

The QI process on the whole has changed our practice protocols for our surgeries for the better with the introduction of lidocaine, a change in the surgical technique and the ethos around pain scoring. The process has led to a great discussion between all team members regarding pain scoring and post-operative care and this in turn has increased our knowledge and skill set. The practice culture has shifted and there is an increased understanding of the need to audit any change to check interventions are improving the problem.

QI has had an extremely positive effect on the team as a whole; the team is naturally extremely interested in improving animal welfare and learning new skills. The whole process has not only involved upskilling the team but being able to have results showing improvement has given a great lift to the team and a sense of pride in their work. The team is most proud of being able to have produced work at a local level and share the results of this audit and others with different practices within the company and the wider veterinary community to help improve standards across the profession.

Continued on next page.

Summary

Clinical audit is a process for monitoring standards of clinical care to see if it is being carried out in the best way possible, known as best practice.

A clinical audit can be described as a systematic cycle. It involves measuring care against specific criteria, taking action to improve it, if necessary, and monitoring the process to sustain improvement. As the process continues, an even higher level of quality is achieved.

What the clinical audit process is used for

A clinical audit is a measurement process, a starting point for implementing change. It is not a one-off task, but one that is repeated regularly to ensure ongoing engagement and a high standard of care.

It is used:

- ⇒ To check that clinical care meets defined quality standards.
- ⇒ To monitor the changes made to ensure that they are bringing about improvements and to address any shortfalls.

A clinical audit ensures concordance with specific clinical standards and best practices, driving improvements in clinical care. It is the core activity in the implementation of quality improvement.

A clinical audit may be needed because other processes point to areas of concern that require more detailed investigation.

A clinical audit facilitates a detailed collection of data for a robust and repeatable recollection of data at a later stage. This is indicated on the diagram wherein in the 2nd process we can see steps 4, 5 and 6 repeated. The next page will take you through the steps the practice took to put this into practice.

The veterinary clinical audit cycle

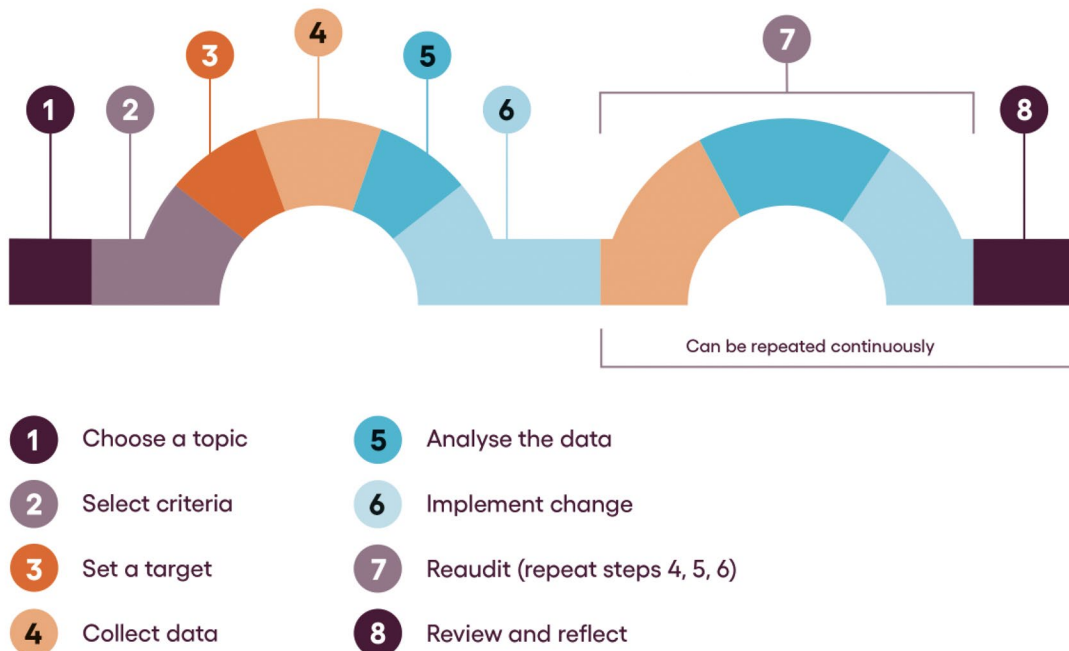


Figure 4: The Veterinary Clinical Audit Cycle by RCVS Knowledge. Available from www.rcvsknowledge.org. Developed by the Royal College of General Practitioners www.rcgp.org.uk/qi-ready

1. Choose a topic relevant to your practice

The topic should be amenable to measurement, commonly encountered and with room for improvement. The practice undertook a prospective audit of canine and feline patients undergoing a range of surgical procedures to assess their post-operative pain management protocols and identify patient groups where improvements could be made.

2. Selection of criteria

Criteria should be easily understood and measured. Prospective data was collected via pain scoring charts and the development of an audit data collection form to aid and simplify data collection.

3. Set a target

Targets should be set using available evidence and agreeing best practices. The first audit will often be an information-gathering exercise, however, targets should be discussed and set. The initial audit data aimed to identify groups of patients and procedures with higher pain scores, in order to inform updated protocols and identify training needs. A re-audit focused on bitch spays, aiming to significantly reduce the number of patients exceeding the pain score intervention threshold.

4. Collect data

Identify who needs to collect what data, in what form and how. All clinical teams collected data on all canine and feline patients undergoing surgical procedures. The re-audit focused on bitch spays with data collected via pain score charts and data collection forms by both vets and nurses. These two documents were used to standardise results and maximise the recording of accurate data.

5. Analyse

Was the standard met? Compare the data with the agreed target and/or benchmarked data if it is available. Note any reasons why targets were not met. These may be varying reasons and can take the discussion from the entire team to identify. The initial audit results showed 11% of dogs and 2% of cats included in the audit exceeded the pain score threshold. 10% of all spay procedures required rescue analgesia. When these procedures were separated into canine and feline groups, it was found 24% of bitch spays required rescue analgesia. Team discussions as to why and follow-up audit to assess the effectiveness of the intervention focused on bitch spays.

6. Implement change

What change or intervention will assist in the target being met? Develop an action plan: what has to be done, how and when? Set a time to re-audit. Following team discussions, a review of existing protocols and the provision of external CPD, it was decided to include the use of lidocaine in the surgical protocols. New dosing charts for lidocaine were created and placed in the prep room to increase familiarity with the new protocol. A concurrent change in surgical technique required an adjustment to the audit structure to include three groups of patients.

7. Re-audit

Repeat steps 4 and 5 to see if changes in step 6 made a difference. If no beneficial change has been observed then implement a new change and repeat the cycle. This cycle can be repeated continuously if needed. Even if the target is not met, the result can be compared with the previous results to see if there is an improvement. Following the implementation and training on lidocaine use, re-audits were carried out with two further groups of patients with differing anaesthetic regimes. This found a sequential reduction in the percentage of patients exceeding the pain score threshold from 24% in Group 1 to 19% in Group 2 and 10% in Group 3.

8. Review and reflect

Share your findings and compare your data with other relevant results. This can help to improve compliance. The audit and interim results are regularly fed back to the team and presented at regional meetings, with other practices now looking at learning from the audit data and structure to inform their own audits. The team extensively share the outcomes of their audits within CVS and externally to the wider profession to aid and inspire other practices to implement QI activities.

Continued on next page.

Annex 1

Audit Group 1: Ovariohysterectomy –

- Premedication: Medetomidine 5µg/kg (increased if needed for fractious dogs), Methadone 0.4mg/kg, Meloxicam 0.2mg/kg.
- Induction: Alfaxalone 1.5mg/kg dose was drawn up and given to effect, in the rare case this is not enough, more would be given to effect.
- Anaesthesia was maintained on Sevoflurane.
- If required the dog would be reversed using Atipamezole, the same dose as Medetomidine used.

Re-audit Group 2: Ovariohysterectomy –

- Premedication: Medetomidine 5µg/kg (increased if needed for fractious dogs) Methadone 0.4mg/kg, Meloxicam 0.2mg/kg.
- Induction: Alfaxalone 1.5mg/kg dose was drawn up and given to effect, in the rare case this is not enough more would be given to effect.
- Anaesthesia was maintained on Sevoflurane.
- If required the dog would be reversed using Atipamezole, the same dose as Medetomidine used.
- Lidocaine is drawn up to a dose of 4mg/kg and a splash block was preformed over the linea alba post closure plus or minus a splash block over each ovarian pedicle.

Re-audit Group 3: Ovariectomy –

- Premedication: Medetomidine 5µg/kg (increased if needed for fractious dogs), Methadone 0.4mg/kg, Meloxicam 0.2mg/kg.
- Induction: Alfaxalone 1.5mg/kg dose was drawn up and given to effect, in the rare case this is not enough, more would be given to effect.
- Anaesthesia was maintained on Sevoflurane.
- If required the dog would be reversed using Atipamezole, the same dose as Medetomidine used.
- Lidocaine is drawn up to a dose of 4mg/kg and a splash block was preformed over the linea alba post closure plus or minus a splash block over each ovarian pedicle.

References

1. Self, I. (ed.) (2019) *BSAVA guide to pain management in small animal practice*. Quedgeley: British Small Animal Veterinary Association
2. *Acute pain assessment scale for dogs* [The Practice Assistance Centre] [online]. Available from: <https://the-pac.co.uk/wp-content/uploads/2020/03/Acute-Pain-Assessment-Scale-For-Dogs-HAG210.pdf>
3. van Goethem. B., Schaefers-Okkens, A. and Kirpensteijn, J. (2006) Making a rational choice between ovarioectomy and ovariohysterectomy in the dog: a discussion of the benefits of either technique. *Veterinary Surgery*, 35 (2), pp. 136-143. <https://doi.org/10.1111/j.1532-950X.2006.00124.x>



This work is licensed under a [Creative Commons Attribution-NonCommercial 4.0 International License](https://creativecommons.org/licenses/by-nc/4.0/). This information is provided for use for educational purposes. We do not warrant that the information we provide will meet animal health or medical requirements.

It is ok to: share, discuss and learn! You can share this resource and adapt the ideas/templates contained within it with your teams, colleagues, and organisations with credit to RCVS Knowledge and the case study author. You can share downloadable links on your socials and within internal networks.

It is not ok to: edit, change, or add to this resource, or claim it as your own. Although you are welcome to use it, adapt the ideas contained within the resource, and reference it, you should not copy and paste it in its entirety. You should always provide a link back to this online resource. You may not use it for commercial purposes, for example, charging for its use, providing it behind a paywall, or providing it as part of a paid-for subscription service.

You should reference this resource like this: RCVS Knowledge and White Lodge Veterinary Surgery (2024). *Post-operative pain scoring bitch spays: A Clinical Audit case example*. [Online] Available at www.rcvsknowledge.org/KA-White-Lodge-pain-score/

Interested in submitting your own case example? Email us at ebvm@rcvsknowledge.org.