Post-operative Pain Management in Cat Spays: A Clinical Audit by Avenue Veterinary Centre (Malvern) Ltd

RCVS Knowledge Quality Improvement Award Highly Commended 2024

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Introduction

Avenue Veterinary Centre is a medium-sized small animal practice with many long-standing team members. We are part of IVC Evidensia and have 5 full-time equivalent (FTE) Veterinary Surgeons and 5.5 FTE Registered Veterinary Nurses (RVN). We are a nurse training practice and take Degree Students on placement. We perform approximately 15 cat spays per month for both private clients and charities.

We have been working with Cats Protection for many years, both at the local branch level and through their neutering voucher scheme. Due to the introduction of their Early (pre-pubertal) Neutering Principles[1], and recommendations produced in association with fellow members of The Cat Group, we started advising clients to neuter their cats earlier at approximately 4 months of age rather than the traditional 6 months of age. Following these updated recommendations and due to some less experienced members joining the team, we looked into the evidence regarding the anaesthetic considerations for these patients[2].

After discussions with the clinical team and having looked at the evidence base, we felt that our pain relief protocol for routine cat spays needed reviewing and updating.

Aims of the clinical audit

This audit aimed to quantify the level of pain our cat spay patients were experiencing with our current protocol and identify where changes could be made. The re-audit after the changes had been made aimed to assess if we had reduced the number of patients scoring above the pain intervention threshold. Ideally, this would be zero patients, but we accepted this may not be possible from one audit cycle and aimed to see a significant reduction as an interim result to identify where further changes could be made to achieve a target of zero.

Actions

The motivation for this audit was discussed with our Head Nurse and the nursing team, and we decided that we would start pain-scoring cats after their spay procedures so that we could quantify the efficacy of our pain relief and anaesthetic protocol. We used the Glasgow Feline Composite Measure Pain Scale (CMPS-Feline)[3] as the team were familiar with this system and it has a validated intervention level of scoring above 5 out of 20, where additional analgesia administration should be considered.

The nursing team caring for the patients' peri- and post-operatively pain-scored the cats at approximately 60 minutes and 120-180 minutes after extubation.

As the lead on this project, I tried to make the process as easy as possible for the team by designing a table to facilitate consistent data collection. This also made it easy to analyse the data once collected and allowed the nursing team to make any relevant notes while maintaining data protection. The information collected included:

- The date
- The animal's unique identification number
- Age
- Pain score at 60 minutes post extubation
- Pain score at 120 – 180 minutes post extubation

Prospective data was collected for 18 cats included in the first audit to establish the baseline using our current protocol of:

- Meloxicam given by subcutaneous injection
- Medetomidine and Ketamine given intramuscularly for induction
- Cats were then intubated and maintained on Isoflurane and Oxygen
- If required, mask induction so that the anaesthetic plane was deep enough for intubation.
- Cats were then reversed with Atipamezole if needed at least 40 minutes after induction.

During the first cycle of our audit using our original pain relief protocol, it became apparent that many of the cats were scoring above the validated intervention level for potentially requiring additional pain relief.

We accessed online CPD provided by the International Society of Feline Medicine (ISFM) and reviewed the QUAD protocol of using equal volumes of Medetomidine, Ketamine, Midazolam and Buprenorphine as described in the Cats Protection Early Neutering Principles guidelines.[1]

From this, we decided that further pain relief was indeed required so added Buprenorphine into our protocol as standard:

- Meloxicam given by subcutaneous injection
- Medetomidine, Ketamine and Buprenorphine given intramuscularly for induction
- Cats were then intubated, maintained on Isoflurane and Oxygen, and reversed with Atipamezole if needed at least 40 minutes after induction.
- Due to spaying many more small kittens as previously discussed, we also altered our dosing of Medetomidine for small cats to be based on Body Surface Area to prevent relative under-dosing.

We decided not to include Midazolam cited in the QUAD protocol at this time as we felt most of our young kittens recovered and ate quickly, plus we did not want to change too much at once so that we could more accurately assess the impact of the changes as we made them.
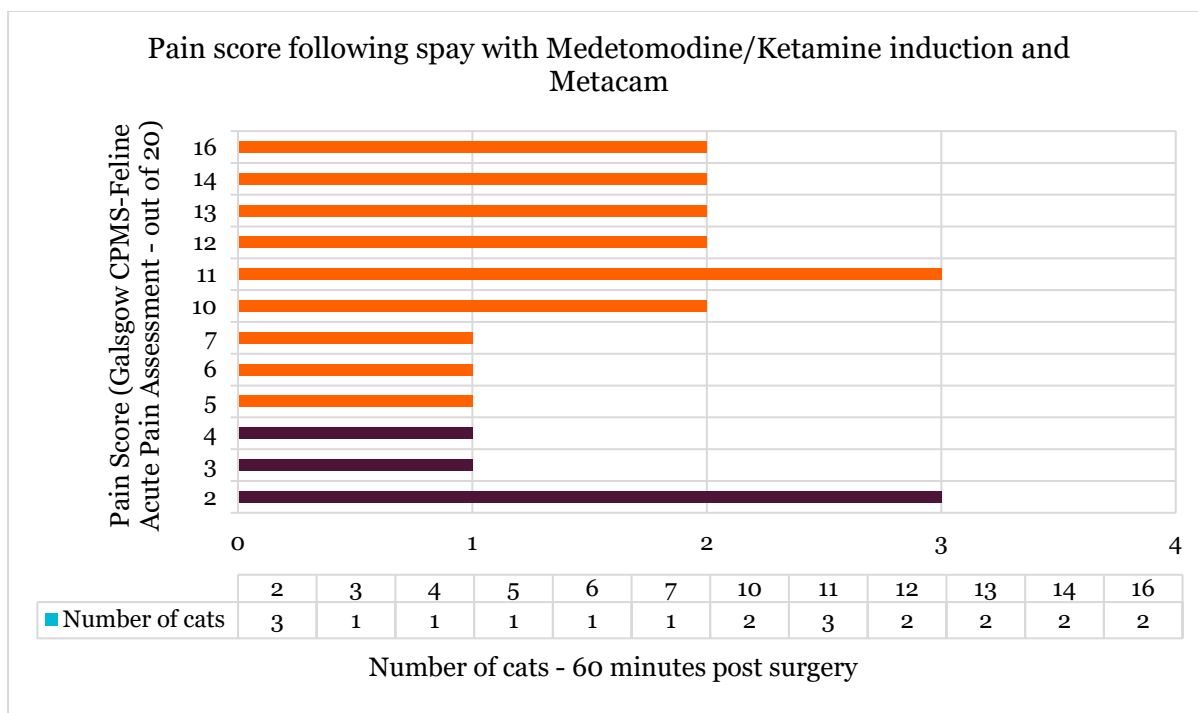
Following this change in protocol, we then repeated the audit collecting prospective data on another 18 cats undergoing the spay procedure and carrying out pain scores in the same manner between April and July 2023. We assessed this data to find out how much improvement had been made and looked to identify any areas for further improvement.

Results

First audit:

Our initial audit using our current protocol showed that:

- 13 out of the 18 cats included scored 5 or more out of 20 on the Glasgow CMPS-Feline Pain Scale at 60 minutes post-extubation.
- This equated to 72% of cats needing additional Buprenorphine analgesia.
- For the cats that did receive additional analgesia, it was felt the second 120-180-minute pain scoring was of little relevance for this audit as their pain scores only improved due to receiving additional analgesia, and not due to being adequately managed with the initial induction protocol we were assessing.
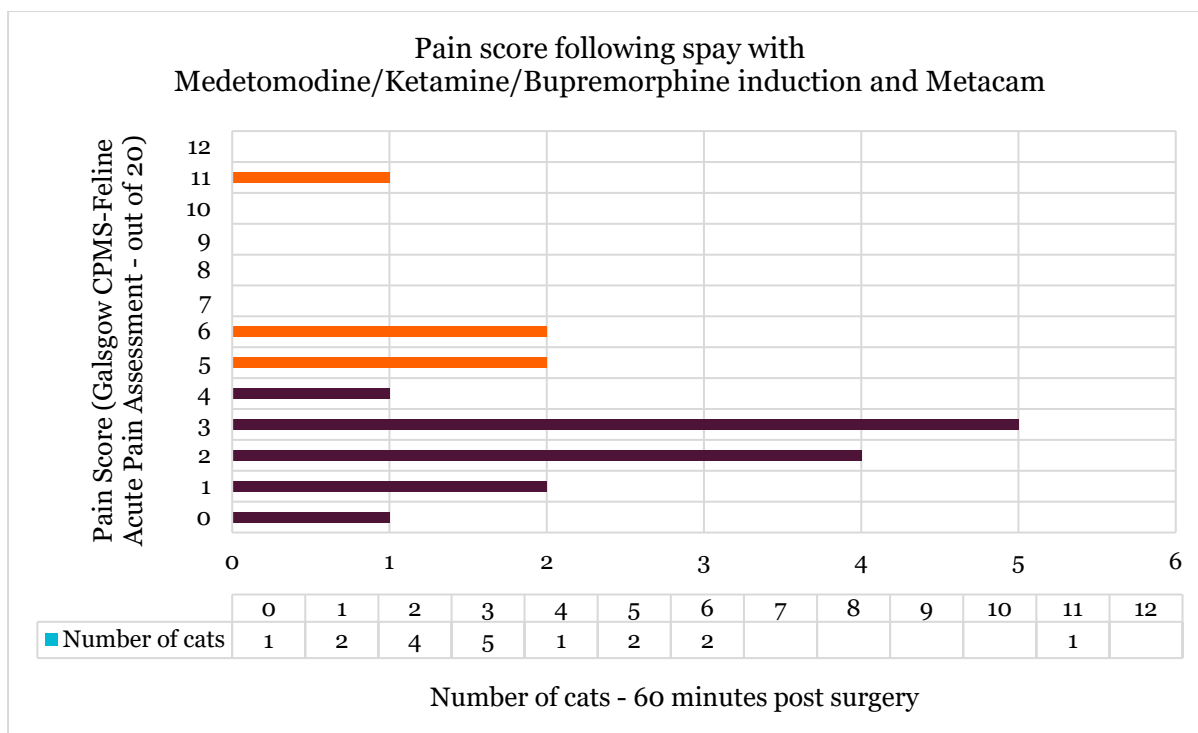
Pain score following spay with Medetomodine/Ketamine induction and Metacam

Number of cats	2	3	4	5	6	7	10	11	12	13	14	16
	3	1	1	1	1	1	2	3	2	2	2	2

Number of cats - 60 minutes post surgery

Figure 1: Results of the 18 cats included in the first audit using the existing protocol of Medetomidine and Ketamine induction.

Re-audit:

With the additional Buprenorphine pain relief given at the time of induction in the new protocol:

- Only 5 out of the 18 cats included scored 5 or more out of 20 on the Glasgow CMPS-Feline Pain Scale at 60 minutes post-extubation.
- This equated to 27.8% of cats needing additional analgesia – a massive 61% reduction.
- There was a further reduction to 22% of cats needing rescue analgesia at the second 120 – 180 minute pain score.
- The nursing team also noted that cats were easier to move from post-operative monitoring kennels back to the cattery, generally happier to be handled and with less signs of stress or aggression due to pain.

Pain score following spay with Medetomodine/Ketamine/Bupremorphine induction and Metacam

	0	1	2	3	4	5	6	7	8	9	10	11	12
■ Number of cats	1	2	4	5	1	2	2					1	

Number of cats - 60 minutes post surgery

Figure 2: Re-audit results of the 18 cats included in the second audit using the new protocol of Medetomidine, Ketamine and Buprenorphine induction.

Based on the re-audit results, we had the information we needed to discuss the reasons we were seeing a proportion of cats with pain scores above the intervention threshold to inform further changes we could make. We felt that as we see many young cats from a shelter background that are potentially unsocialised and unaccustomed to being handled, some of the indicators on the pain score were scoring high regardless of surgery. These included behaviours such as being hunched at the back of the kennel and/or showing signs of anxiety and aggression. We recognised that these indicators need to be viewed subjectively when assessing these patients, and discussed ways in which we could reduce stress, such as using calming pheromone diffusers (Feliway ™) and providing the cats with space to hide in their kennels.

Impact of intervention

This was the first QI project I had run at the practice. There was minimal resistance to the project with the nursing team keen to get involved with the pain scoring and supportive of the reasons why we were looking at making changes. The main barrier was really to change in general due to the perception that there were no issues with our current protocols and

procedures. Once we delved deeper and the benefits to patients and the team were demonstrated, this was quickly overcome.

Following the success shown in the second cycle of this project all of the team were really keen to discuss what we could do to further improve, why there was still 1 in 5 cats pain scoring 5 or more out of 20 post-operatively and if there was anything more we could be doing.

We discussed that there had been a large number of young cats from a shelter who were quite unsocialised and therefore fearful, which significantly added to their pain scores. For example, on the Glasgow CMPS-Feline Pain Assessment[3] question two "cowering at back of cage" scores a 2 and question seven "anxious/fearful" scores a 2 – so if cats are scared in the hospital environment they would only need 1 more point in the remaining questions to push them over the validated intervention level.

Following these team discussions, we put in place additional actions to try to make further improvements, including:

- Trying to give the Buprenorphine at least 30 minutes prior to the procedure so there is time for the analgesia to take effect
- Using lower doses of Atipamezole when reversal was needed so the pain relief from Medetomidine is not fully reversed
- Ensuring that we always use Feliway (both as a plug-in in the cattery and sprays on bedding) and hideaways in kennels to help with the stress of cats (something we do already).

We have now trialled the lower dosing of Atipamezole post-operatively by using approximately a third of the dose of Medetomidine given (on a case-by-case basis), whereas previously we were always using half the dose of the Medetomidine given. This has the benefit of cats being more awake and able to be extubated more quickly while reducing the sudden excitable recovery which we previously saw, particularly with kittens suddenly waking up after their Atipamezole.

As a team we are actively encouraging new QI projects and ideas, using evidence-based veterinary medicine to guide our patient-centred care and best practice. We support openness and discussion of projects, including if they do not have the expected or wanted outcome and aim to use this as a positive learning experience. This is always a topic of conversation in whole team meetings held at least quarterly, including members of the support teams. We discuss ongoing projects, little wins and infection prevention and control including antibiotic usage and ear cytology.

These results have been shared with the wider IVC Evidensia group by summarising and uploading tables and graphs onto the Quality Improvement Hub. I have also shared my experiences and outcomes with other IVC Evidensia practices by presenting on Quality Improvement at both our local Area Meeting with 6 other small animal practices and the Area Head Nurse Meeting, where I discussed the benefits of nurse involvement with Quality Improvement.

The obvious positive results and improvements made with this project have led to greater acceptance of introducing changes with an improved learning culture. This has helped foster a more open environment with all team members feeling happier to make suggestions and look at areas they may want to run projects on themselves. This project has helped unify the team, who regularly discuss introducing other measures using similar QI methods such as benchmarking and guidelines for other initiatives. It really helps to get all of the team involved and celebrate the improvements that we achieve.

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.
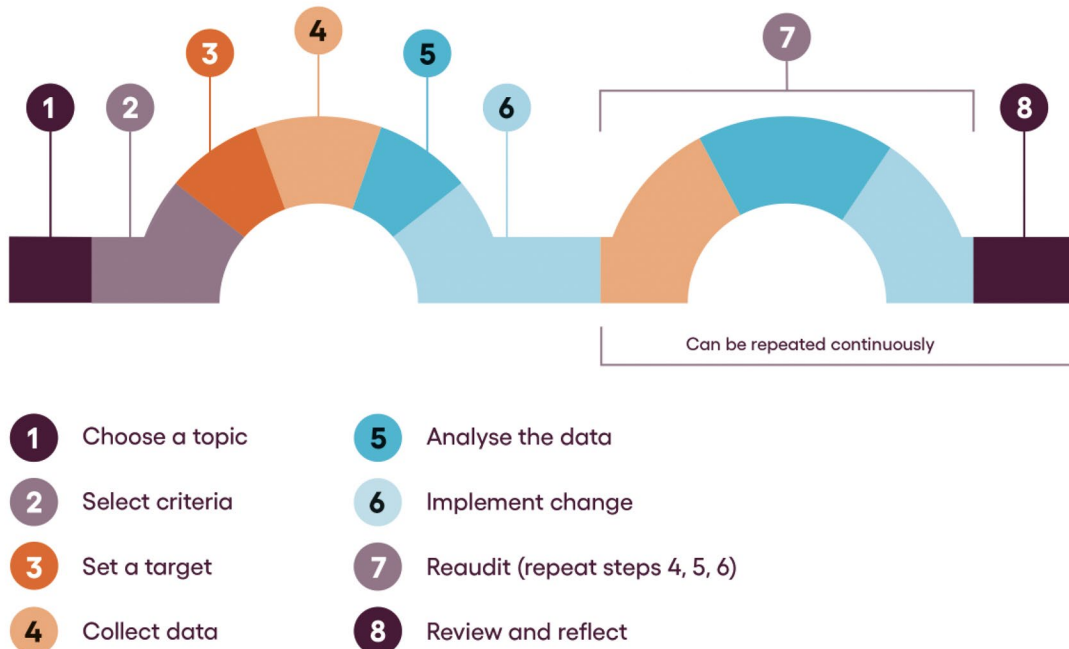
The veterinary clinical audit cycle

Figure 3: 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. Following the introduction of pre-pubertal neutering recommendations, the team decided to review and quantify the efficacy of their feline spay anaesthesia and pain management protocols.

2. Selection of criteria

   Criteria should be easily understood and measured. All feline patients undergoing routine spay procedures were included in this audit. All patients were pain-scored using the Glasgow Feline Composite Measure Pain Scale (CMPS-Feline) at 60 minutes and 120 -180 minutes post-surgery.

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. This audit aimed to see a reduction in the number of cats exceeding the pain intervention threshold. Ideally, this would be zero patients, but the team recognised this may not be possible from one audit cycle, so aimed to see a significant reduction as an interim result to inform where further interventions may be needed.

4. Collect data

Identify who needs to collect what data, in what form and how. Prospective data was collected at 60 minutes and 120 -180 minutes post-surgery by all nursing staff. A table collecting anonymous key information was designed to aid with easy and accurate data collection and analysis whilst maintaining data protection.

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 found that at the 60 minute post-surgery pain score, 72% of cats exceeded the validated intervention threshold where additional analgesia should be considered.

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. The team discussed and agreed upon a change to their protocols, where Buprenorphine was given at induction and the dosing of Medetomidine for small cats to be based on Body Surface Area.

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 them 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. The re-audit showed a reduction in the number of cats exceeding the intervention threshold at the 60 minute post-surgery time point to 27%. Pain scoring cats at 120 -180 minutes became easier, with only 22% of cats exceeding the intervention threshold at this time point, and generally being happier to be handled with less signs of stress.

8. Review and reflect

Share your findings and compare your data with other relevant results. This can help to improve compliance. The results of the full audit cycle have been discussed at whole team meetings, with further interventions discussed and implemented. The need to use a reversal agent is decided on a case by case basis and given at a lower dose rate along with adjunctive methods of managing fearful cats in the cattery. The practice now has a greater understanding of improvement activities and a strong learning culture. Audit results and learnings have been presented to the wider IVC Evidensia Group via their QI Hub.

References

1. *Earlier Neutering Principles* [Cats Protection] [Online] Available from: https://cat-kind.org.uk/media/10661/neu_7999-kitten-neutering-principles_digital.pdf
2. Joyce A, Yates D (2011) Help stop teenage pregnancy! Early-age neutering in cats. *Journal of Feline Medicine and Surgery,* 13(1). https://doi.org/10.1016%2Fj.jfms.2010.11.005
3. *Glasgow Feline Composite Measure Pain Scale: CMPS – Feline* [WSAVA] [Online] Available from: https://wsava.org/wp-content/uploads/2020/01/Feline-CMPS-SF.pdf