Short communication

Definitive Glasgow acute pain scale for cats: validation and intervention level

J. Reid, E. M. Scott, G. Calvo, A. M. Nolan

THE usefulness of a pain assessment instrument is enhanced in general practice if the score can be linked to an intervention level, which is informative as to whether or not an animal requires analgesic treatment. Previously the authors described the derivation of an intervention level for the Glasgow Composite Measure Pain Scale (CMPS) short form tool for assessing acute pain in dogs (Reid and others 2007). More recently, the authors reported the validation of a behaviour-based tool (the rCMPS-F) for the assessment of acute pain in cats that was developed using psychometric principles (Calvo and others 2014). It takes the form of a structured questionnaire completed by an observer following a standard protocol and includes assessment of spontaneous and evoked behaviours, interactions with the animal and clinical observations. Construction and clinical testing of the tool supported its validity and provided some evidence for responsiveness, but sensitivity was moderate (misclassification, 26.7 per cent). In order to improve the performance of the tool, a simple three-point facial scale, which in preliminary testing had performed very well in classifying cats in pain, was developed (Holden and others 2014) with the intention of embedding it within the behaviour-based cat tool, an approach adopted previously in paediatric medicine (CRIES (Krechel and others 1995); Premature Infant Pain Profile (Stevens and others 1996)). This communication describes a single, multicentre study designed to (i) validate the combined tool (CMPS-Feline) using a known groups design based on those cats requiring analgesia compared with those that did not according to clinical veterinary impression and (ii) derive an intervention-level score for analgesia for the composite tool, the CMPS-Feline.

The facial component was embedded within the rCMPS-F as shown in Fig 1. In total, 119 cats, 65 males and 54 females, median age 63 months (range 1–240 months) undergoing postoperative care or having been admitted for surgery or any acutely painful trauma or medical condition to one of three University Veterinary Schools, four small animal general practices or two charity veterinary clinics were recruited to the study. No restrictions were placed on the breed, age or sex of the cats, the type of surgical procedure, trauma or medical condition or timing of the assessment. All cats were evaluated for sedation using a sedation scoring scale (0–3) modified from Lascelles and others (1994) and previously described (Calvo and others 2014); any cats with a score >1 were excluded from the study. In total, 45 cats underwent surgical procedures and 74 did not. All cats were scored by a veterinary nurse/technician using the CMPS-Feline and thereafter a veterinary surgeon, blinded to the score responded to the question '*Do you think this animal requires analgesia? Yes/no*'. The total score (from a possible maximum of 20) was computed by summing the answers to all questions. The project was approved by the University of Glasgow Veterinary School ethics committee.

Boxplots were used to compare cats that required analgesia compared with those that did not. Formal analysis involved Mann-Whitney and 95 per cent CIs for medians. Linear discriminant analysis (LDA)[i] was used to determine the intervention-level score. Statistical analyses were carried out using MINITAB version 14 (Minitab, Microsoft Corporation). Of the 119 cats, 49 were recorded as not requiring analgesia, 70 were recorded as requiring analgesia with median scores 1 (range 0–8) and 8 (range 2–16) respectively for the two groups (Fig 2). LDA was first used to classify cats as requiring analgesia (yes/no). Using the total score from the combined tool, 82.4 per cent of the cats were correctly classified with the intervention level set at 5 and above. From the results, 43 out of 49 (88 per cent) of the no analgesia cats and 55 out of 70 (78.6 per cent) of analgesia cats were correctly identified.

Hypotheses used for testing construct validity of pain scales include 'known groups' validity where the instrument should be able to distinguish correctly between groups expected to have different scores. Facial expression is considered a sensitive indicator of noxious procedures, and extensive research has gone into its use for measuring acute and postoperative pain intensity in neonates (Grunau and others 1998, Tomlinson and others 2010). Work conducted in animals has led to the development of standardised facial coding systems for recording pain in rodents, for example, the Mouse Grimace Scale (Langford and others 2010); Rat Grimace Scale (Sotocinal and others 2011), rabbits (Keating and others 2012) and, more recently, a pain expression scale for horses was described (Dalla Costa and others 2014). Facial expression scales have been previously incorporated into multidimensional measure pain instruments (Stevens and others 1996, Hand and others 2010), and the authors hypothesised that the incorpor- ation of their simple facial scale would improve the performance of the behaviour-based tool. The result from this study has indi- cated enhanced discriminatory ability of the holistic tool, the CMPS-Feline, compared with the rCMPS-F (misclassification rates of 17.6 per cent and 26.7 per cent, respectively). Brondani and others (2013) defined an intervention level for the English version of their cat pain tool; however, there were marked differences in study designs compared with this work. All their cats underwent the same standardised soft tissue procedure (ovariohysterectomy) and scoring was performed by observers trained in anaesthesia. In contrast, the study reported here was undertaken in clinical environments where acute pain would arise

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[i]Discriminant analysis creates a classification rule that can be used to predict which class or group (analgesia yes/no) a cat belongs to. This is done by estimating the probabilities that the cat belongs to each class/group.

Glasgow Feline Composite Measure Pain Scale: CMPS- Feline

Choose the most appropriate expression from each section and total the scores to calculate the pain score for the cat. If more than one expression applies choose the higher score

LOOK AT THE CAT IN ITS CAGE:

Is it?

Question 1

Silent / purring / meowing	0
Crying / growling / groaning	1

Question 2

Relaxed	0
Licking lips	1
Restless/cowering at back of cage	2
Tense/crouched	3
Rigid/hunched	4

Question 3

Ignoring any wound or painful area	0
Attention to wound	1

Question 4

a) Look at the following caricatures. Circle the drawing which best depicts the cat's ear position?tt

0 1 2

b) Look at the shape of the muzzle in the following caricatures. Circle the drawing which appears most like that of the cat?

0 1 2

FIG 1: The Glasgow Composite Measure Pain Scale-Feline

from varied sources including postsurgical, trauma and medical cases, and where its assessment would be undertaken by observers of varying levels of experience, thus assessing its robustness for use in general practice. In summary, the CMPS-Feline with its embedded facial image component has been shown to be a valid scale for the measurement of acute pain in cats in general veterinary practice with a recommended intervention level of 5 and above (out of a total possible score of 20). The CMPS-Feline displayed increased discriminatory ability over the previously described rCMPS-F.

APPROACH THE CAGE, CALL THE CAT BY NAME & STROKE ALONG ITS BACK FROM HEAD TO TAIL

Question 5

Does it?

Respond to stroking	0

Is it?

Unresponsive	1
Aggressive	2

IF IT HAS A WOUND OR PAINFUL AREA, APPLY GENTLE PRESSURE 5 CM AROUND THE SITE. IN THE ABSENCE OF ANY PAINFUL AREA APPLY SIMILAR PRESSURE AROUND THE HIND LEG ABOVE THE KNEE

Question 6

Does it?

Do nothing	0
Swish tail/flatten ears	1
Cry/hiss	2
Growl	3
Bite/lash out	4

Question 7

General impression

Is the cat?

Happy and content	0
Disinterested/quiet	1
Anxious/fearful	2
Dull	3
Depressed/grumpy	4

Pain Score ... /20

FIG 1 Continued

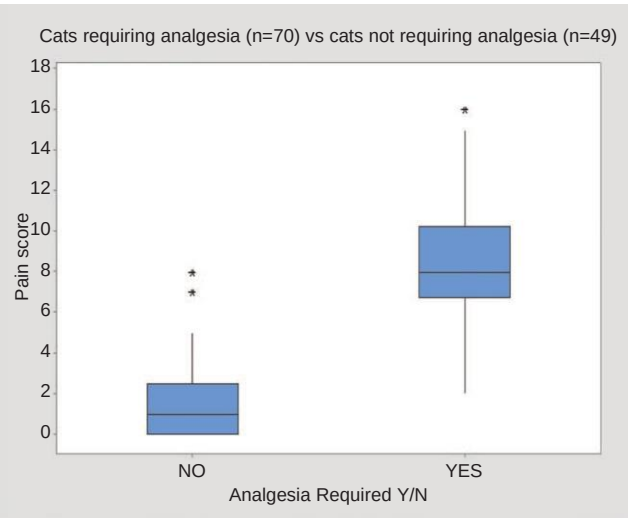

FIG 2: Boxplot of known group CMPS-Feline pain scores. Mann-Whitney P value <0.005 and 95 per cent CI for difference in median (analgesia (yes)-analgesia (no)) was 6–8

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