In Dogs That Have Had Intussusception Does Enteroplication Prevent Recurrence?

A Knowledge Summary by

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KNOWLEDGE SUMMARY

Clinical bottom line

The number of published primary papers on enteroplication as a preventative surgical procedure for recurrent intussusception is currently low with a relatively small number of cases reported in the studies. The studies did not demonstrate a statistical difference in the recurrence rate with or without the procedure although there was a consistent trend for a reduction in the recurrence rate with enteroplication.

Enteroplication has also been associated with severe complications, thus surgeons must weigh the risk of recurrent intussusception against the risk of complications with enteroplication. More definitive conclusions cannot be made until higher quality evidence is available on the topic.

Question

In Dogs That Have Had Intussusception Does Enteroplication Prevent Recurrence?

Clinical Scenario

You are presented with an eight-month old male entire Golden Retriever that has been diagnosed with intussusception based on the history, physical examination and radiographic findings. You wonder whether doing an enteroplication, as part of this dog's surgical treatment, is going to reduce the probability of recurrent intussusception.

Summary of the evidence

Levitt (1992)	
Population:	Thirty-six cases (27 dogs and 9 cats) with confirmed diagnosis of intussusception through clinical history, physical examination, plain abdominal radiography and contrast radiography, during a 7-year period.
Sample size:	Twenty-seven dogs and nine cats.
Intervention details:	(i) Simple reduction was performed in 10 dogs, 4 of which also underwent intestinal plication. (ii) Intestinal resection and anastomosis were deemed necessary in 14 dogs, 2 of which also underwent intestinal plication. No surgery was performed in 3 cases and these dogs were euthanised at the request of their owners.
Study design:	Retrospective single-centre case series.
Outcome studied:	Identification of a common predisposing cause, correlation between the duration of clinical signs or location of lesion and the presence of

	adhesions, and simple associations of the recurrence rate versus the surgical technique utilised and the bowel segment involved.
Main findings: (relevant to PICO question):	(i) In 3/10 dogs that had simple reductions an intussusception recurred within 24-120 hours after the initial surgery, 1 of which had also undergone jejunal plication. (ii) In 2/14 dogs that had intestinal resection/anastomosis alone an intussusception recurred within 24-120 hours after the initial surgery. • No common predisposing cause could be established. • Intussusception recurrence rate is not related either to the surgical technique utilised or to the bowel segment involved. • No correlation could be established between the duration of the clinical signs or the location of the lesion and the presence of adhesions.
Limitations:	• The study is retrospective, with a small number of cases. • The study was performed on data from a single referral teaching hospital (multiple hospitals would be preferable in order to obtain more generalisable results; also different hospitals might have different processes/protocols). • The study is 25 years old. • The efficacy of enteroplication, as a prophylactic measure, could not be adequately demonstrated due to small number of cases in which plication was performed. • Long-term follow-up is not available for all the cases. • The cases cover a seven-year period. • The dog that had the recurrence of the intussusception post plication (just proximal to site of plication) had undergone a jejunal plication and not a complete plication of the jejunum and ileum, which is the recommended technique (Wolfe, 1977). This is due to the propensity for intussusceptions to recur at anatomic sites different from the primary lesion. • It is not clear whether any of the other 5 dogs that underwent plication had their entire small intestine plicated or just a segment of it.

Oakes (1994)	
Population:	Thirty-one dogs that had undergone surgery for correction of intussusceptions and had been followed up for at least 21 days after surgery, during a 14-year period.
Sample size:	Thirty-one dogs.
Intervention details:	(i) Simple reduction was performed in 3 dogs. (ii) Resection and anastomosis was performed in 26 dogs. (iii) Simple reduction with serosal patch application was performed in 1 dog. (iv) Details of the surgery were not available for 1 dog.

	Enteroplication was performed in 9 dogs. From these, 5 had their entire ileum and jejunum plicated, 3 only had a small segment of their small intestine plicated and for 1 dog there were no details of the enteroplication procedure available.
Study design:	Retrospective dual-centre case series.
Outcome studied:	Efficacy of enteroplication in preventing recurrence of intussusception in dogs and determination of its adverse clinical effects.
Main findings: (relevant to PICO question):	• A total of 6/22 (28%) dogs that did not undergo enteroplication had a recurrence 1-9 days post operatively: (i) One dog that had undergone simple reduction. (ii) Five dogs that had undergone resection and anastomosis; In one case the intussusception was caused by the continuous presence of a linear foreign body. • None of the dogs that underwent enteroplication had a recurrence. • Complications after surgery included diarrhoea in 6/9 (67%) dogs with and in 10/22 (45%) dogs without enteroplication and anastomotic leakage requiring second surgery in 2/9 (22%) cases with and in 2/22 (9%) cases without enteroplication. • In 13/16 (81%) cases without and in 10/13 (77%) cases with enteroplication (plication having been performed at initial surgery or after recurrence) became clinically normal without any gastrointestinal abnormalities 3 days -3 months after surgery, according to their owners. One dog that had enteroplication developed canine distemper and was euthanised.
Limitations:	• The study is retrospective, with a small number of cases. • The study is 23 years old; new scientific data might have been published since then on this subject and different protocols might be being used. • The efficacy of enteroplication as a prophylactic measure could not be adequately demonstrated due to small number of cases in which plication was performed. • It is not clear whether the dogs that underwent enteroplication had previously undergone simple reduction or resection and anastomosis. • Long-term follow-up with regards to post op complications and survival is not available for all the cases. • Details of the surgery were not available for all the cases. • In three dogs the plication involved only a small segment of the small intestine and not the entire jejunum and ileum, which is the recommended technique (Wolfe, 1977). • Follow-up information was sometimes collected from the

	owners and not vet reports. • It is not clear whether the dog that developed distemper post operatively has had investigations for that prior to surgery, since this could have potentially been a predisposing factor all along.

Applewhite (2001)	
Population:	Thirty-five dogs with intestinal intussusception diagnosed by means of ultrasonography or exploratory celiotomy.
Sample size:	Thirty-five dogs.
Intervention details:	• Intussusception was spontaneously reduced in 1 dog. • Simple reduction was performed in 7 dogs. • Resection and anastomosis were deemed necessary in 27 dogs. • Intestinal plication was performed in 16 dogs, 10 of which had undergone resection and anastomosis, 5 had undergone manual reduction and 1 had spontaneous reduction.
Study design:	Retrospective dual-centre case series.
Outcome studied:	Comparison of complications and recurrence rates in dogs treated for intestinal intussusception that underwent enteroplication (of their entire jejunum and ileum) to rates in dogs treated for intussusception that did not undergo enteroplication.
Main findings: (relevant to PICO question):	• None of the dogs that underwent enteroplication had a recurrence, whereas 1 of the 19 dogs that did not undergo enteroplication had a recurrence 48 hours post operatively. • Three dogs developed complications associated with enteroplication. In 2 dogs, intestinal obstruction developed because of material that was unable to pass through. In the third dog, a segment of small intestine became strangulated between enteroplication sutures in the jejunum. • Statistical analysis revealed no significant difference in the likelihood of recurrence of intussusception between the dogs that underwent enteroplications at their first surgery and dogs that did not. • The likelihood of undergoing a second surgery either due to a complication or due to recurrence was not significantly different between the two groups.
Limitations:	• The study is retrospective, with a small number of cases. • The study is 16 years old; new scientific data might have been published since then on this subject and different protocols might be being used. • The cases cover an eleven-year period. • Follow-up information was sometimes collected from the

	owners and not vets.

Wolfe (1977)	
Population:	Two young dogs with subsequent recurrent intestinal intussusception within 3 days of initial surgical reduction.
Sample size:	Two dogs.
Intervention details:	• Simple reduction was performed in both dogs. One dog developed 2 subsequent intussusceptions on the 3rd and on the 4th postoperative day. The first one was managed with simple reduction and the second one with resection and anastomosis and enteroplication from the duodenocolic ligament to the descending colon. • One dog developed 1 recurrent intussusception on the 2nd postoperative day. This was managed with simple reduction and enteroplication from the duodenocolic ligament to the descending colon.
Study design:	Case reports
Outcome studied:	Not applicable.
Main findings: (relevant to PICO question):	• Subsequent recurrence of intestinal intussusception was prevented with intestinal plication in both cases. • No complications were noted following enteroplication in these cases.
Limitations:	• Very small number of cases, thus very difficult to draw conclusions safely. • The study is 25 years old. • Long-term follow-up is not available for the cases. • Data from case reports, and any conclusions or speculation drawn from it, clearly do not have the weight of findings that other types of research studies have.

Appraisal, application and reflection

Recurrence of intussusception following surgical correction is not uncommon in dogs; the recurrence rate was reported to be as high as 22% in one study (Levitt, 1992). It usually occurs within 20 days of surgery and is most commonly reported to be proximal to the initial intussusception site. When a predisposing factor for intussusception has not been identified techniques for prevention of recurrence should be considered (Wolfe, 1977). Enteroplication is a surgical technique that has been used within the studies as a way to prevent recurrence of intussusception. However, not many studies have been carried out to determine its efficacy and the possible complications that it might involve. All relevant studies identified that discuss the efficacy of enteroplication as a prophylactic measure for recurrent intussusception are old retrospective case series and case reports, that only involve a small number of cases. Retrospective case series and case reports sit low on the hierarchy of evidence, so, it would be difficult to draw definitive conclusions from the available literature.

It appears, though, that enteroplication reduced the probability of recurrent intussusception in all the studies, but statistical analysis did not reveal any significant difference in the likelihood of recurrence of intussusception between dogs that underwent enteroplication at the first surgery and dogs that did not. Further to this, it appears that enteroplication can result into severe complications, including intestinal

obstruction with vegetative material and strangulation of enteroplicated loops between enteroplication sutures. All three retrospective case series that were identified recommend that the plication, when performed, should include the entire small intestine from the distal duodenum to the distal ileum (Applewhite, 2001; Levitt, 1992; Oakes, 1994). The only case that developed subsequent recurrent intussusception following enteroplication in one study had undergone a jejunal plication alone (Levitt, 1992).

Due to the retrospective nature of these studies it is impossible to definitively state that plication reduces recurrence rate since there could be other factors, which have not yet been identified, affecting that as well. In order to fully evaluate the role of enteroplication in preventing recurrent intussusceptions a prospective, multi-institutional, randomised clinical study using a standardised enteroplication technique is needed. Therefore, until higher quality research is available, veterinary surgeons must weigh the risk of recurrent intussusception against the risk of complications with enteroplication.

Methodology Section

Search Strategy	
Databases searched and dates covered:	CAB Abstracts via the Ovid platform covering from 1973 to 2017 Week 19. Medline via the Ovid platform covering from 1946 to 2017. The reference list for the studies that were identified has also been searched.
Search terms:	(dog OR dogs OR canine OR canid*) AND (intussusception) AND (enteroplication)
Dates searches performed:	May 8th 2017

Exclusion / Inclusion Criteria	
Exclusion:	Comment letters, single case reports and articles which were not relevant to the PICO question.
Inclusion:	Articles available in English which were relevant to the PICO. Articles had to involve more than one animal. The reference checklist for each study that was identified was also searched.

Please add rows as necessary

Search Outcome						
Database	**Number of results**	**Excluded – Comment letter**	**Excluded – single case report**	**Excluded – irrelevant to PICO**	**Excluded – not accessible**	**Total relevant papers**
CAB Abs	8	1	2	3	0	2
Medline	8	1	2	3	0	2

Reference list checking	22	0	3	17	0	2
Total relevant papers when duplicates removed						4

CONFLICT OF INTEREST

The authors declare no conflict of interest.

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