Effects of urinary bladder retroflexion and surgical technique on postoperative complication rates and long-term outcome in dogs with perineal hernia: 41 cases (2002–2009)

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Objective—To evaluate the effects of urinary bladder retroflexion (UBR) and surgical technique on postoperative complication rates and long-term outcome in dogs with perineal hernia.

Design—Retrospective case series.

Animals—41 client-owned dogs with perineal hernia that underwent surgery between November 2002 and November 2009.

Procedures—Medical records were reviewed for information on dog signalment, history, physical examination findings, ultrasonographic findings, surgical techniques, intraoperative complications, duration of hospital stay, postoperative complications, and long-term outcome.

Results—31 dogs had no UBR, and 10 dogs had UBR. Internal obturator muscle transposition (IOMT) was performed in 20 dogs, and a cystopexy or colopexy was performed before the IOMT (LapIOMT) in 21. Postoperative complications included tenesmus (n = 8) and urinary incontinence (1). Rates of postoperative complications were not significantly different between the no-UBR and UBR groups or between the IOMT and LapIOMT groups. Thirty-two dogs were free of clinical signs at the time of the study. The median disease-free interval did not differ significantly between dogs in the no-UBR and UBR groups, but it was significantly lower in the LapIOMT group than in the IOMT group. None of the 7 dogs with UBR that were treated without cystopexy developed recurrence of UBR.

Conclusions and Clinical Relevance—UBR was not associated with an increased rate of postoperative complications relative to no UBR and had no effect on the long-term outcome in dogs with perineal hernia. The use of IOMT alone may be recommended for clinical use because LapIOMT offered no clear advantage. (J Am Vet Med Assoc 2013;243:1442–1447)
treated with IOMT, and the dogs’ conditions had been followed up for at least 6 months. Dogs were divided into a UBR group and a no-UBR group.

**Medical records review**—Dog signalment, primary clinical signs, duration of clinical signs, physical examination, findings, results of abdominal ultrasonography, surgical techniques used, intraoperative complications, duration of hospital stay, postoperative complications, outcome, and cause of death were collected from the medical records. Perineal hernia had been diagnosed on the basis of medical history, physical examination, and rectal examination findings. Surgical techniques used were classified as IOMT only or as LapIOMT when a cystopexy or a colopexy was performed with a laparotomy before IOMT. Urinary incontinence was defined as involuntary dribbling of urine. Fecal incontinence was defined as involuntary fecal losses. Tenesmus was defined as persistent or prolonged straining or painful defecation. Recurrence was defined as the development of obvious perineal swelling or loss of support of the rectal wall on a side on which surgery had been performed, as detected via rectal examination. Follow-up interval was defined as the interval between surgery and the last entry in the medical record at the Clinique vétérinaire Alliance or the last contact with the owner or referring veterinarian.

**Statistical analysis**—Descriptive statistics were calculated, with median and range reported. The Wilcoxon rank sum test was performed to compare age, body weight, duration of clinical signs before surgery, duration of hospital stay, and follow-up time between the no-UBR and UBR groups and between IOMT and LapIOMT groups. The Fisher exact test was used to compare the incidence of unilateral and bilateral perineal hernia and postoperative complications between groups. Kaplan-Meier survival analysis was used to determine the DFI. The log-rank test was used to compare median DFI between groups. A dog was classified as disease free when clinical signs related to perineal hernia were absent > 1 month after surgery. At the time of final follow-up (median, 53 months), dogs were censored when they were free from clinical signs at the time of final follow-up, died of causes unrelated to perineal hernia, or were lost to follow-up. All analyses were performed with a commercially available software package.\(^5\) Values of \(P < 0.05\) were considered significant.

<p>| Table 1—Summary of signalment variables (median [range]) and distribution of bilateral herniation (No. affected) in dogs with perineal hernias with (n = 10) or without (31) UBR that underwent LapIOMT or IOMT. |</p>
<table>
<thead>
<tr>
<th>Variable</th>
<th>IOMT (n = 13)</th>
<th>LapIOMT (n = 18)</th>
<th>IOMT (n = 7)</th>
<th>LapIOMT (n = 3)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (y)</td>
<td>9 (6–15)</td>
<td>8 (6–12)</td>
<td>11 (10–12)</td>
<td>9 (11–17)</td>
</tr>
<tr>
<td>Body weight (kg)</td>
<td>22.5 (7–42)</td>
<td>22.5 (7–42)</td>
<td>7 (3.9–7.9)</td>
<td>7 (3.9–7.9)</td>
</tr>
<tr>
<td>Duration of clinical signs (d)</td>
<td>60 (3–365)</td>
<td>60 (3–365)</td>
<td>90 (20–210)</td>
<td>90 (20–210)</td>
</tr>
<tr>
<td>Bilateral herniation</td>
<td>3</td>
<td>11</td>
<td>3</td>
<td>3</td>
</tr>
</tbody>
</table>

In the UBR group, each dog in the LapIOMT subgroup underwent a combination cystopexy and colopexy. In the no-UBR group, each dog in the LapIOMT subgroup underwent a colopexy. None of the values differ significantly (ie, \(P > 0.05\)) between IOMT and LapIOMT groups.

**Results**

Forty-one dogs met the inclusion criteria. Ten dogs were included in the UBR group and 31 in the no-UBR group. Breeds of dogs were as follows: mixed (n = 5), Yorkshire Terrier (5), Coton de Tulear (4), Maltese (4), Collie (4), German Shepherd Dog (3), Poodle (3), Boxer (2), Dachshund (2), French Spaniel (2), Lhasa Apso (1), Chihuahua (1), Bernese Mountain Dog (1), Labrador Retriever (1), Doberman Pinscher (1), Fauve de Bretagne (1), and French Bulldog (1). All dogs were sexually intact males. Median age at initial evaluation was 9 years (range, 6 to 17 years), and median body weight was 10.5 kg (23.1 lb; range, 3.1 to 42 kg [6.8 to 92.4 lb]). Age was significantly \((P = 0.006)\) greater for dogs in the UBR group (median, 11 years; range, 9 to 17 years) than for dogs in the no-UBR group (median, 8 years; range, 6 to 15 years).

Body weight was significantly \((P = 0.009)\) lower for dogs in the UBR group (median, 20.0 kg [44.0 lb]; range, 3.1 to 42.0 kg) than for dogs in the no-UBR group (median, 6.6 kg [14.5 lb]; range, 3.9 to 17.0 kg [8.6 to 37.4 lb]). Seventy-five percent of the dogs with UBR had a body weight < 9.4 kg (20.7 lb). The median interval between first clinical signs of perineal hernia and surgery for all dogs was 60 days (range, 3 to 730 days). Physical examination revealed that 21 (51%) dogs had a unilateral perineal hernia and 20 (49%) dogs had a bilateral perineal hernia. Thirty-nine (95%) dogs had a history of tenesmus. Thirty-five (85%) dogs also had a history of perineal swelling, and 9 (22%) had a history of dysuria.

No difference was evident in the median duration of clinical signs between dogs with UBR (60 days; range, 3 to 730 days) and without UBR (140 days; range, 20 to 210 days; \(P = 0.23\)). Rectal examination revealed loss of support of the rectal wall in all dogs, with a deviation toward the side of the hernia for dogs with a unilateral hernia and a dilation for dogs with a bilateral hernia. The distribution of bilateral (vs unilateral) hernias was not significantly \((P = 0.48)\) different between dogs with (14/31) and without (6/10) UBR.

Abdominal and perineal ultrasonography were performed in 32 dogs. Urinary bladder retroflexion was identified in 10 (24%) dogs, and this finding was confirmed at the time of surgery. Urinary bladder retroflexion was not diagnosed in any other dogs at the time of surgery. Prostatic disease was identified in 15 (37%)
dogs and included a large prostate (13), an intraprostatic cyst 3 cm in diameter (1), and a paraprostatic cyst 8 cm in diameter (1).

Surgical procedures—All surgeries were performed by a board-certified surgeon (SB), and a pre-  
scrotal open castration was performed for all dogs. An IOMT procedure was performed in 20 dogs (7 with  
o no UBR and 13 with UBR) as described by Orsher and Johnston.  
A LapIOMT procedure was performed in 21  
dogs, including colopexy in 18 dogs with no UBR and  
cystopexy and colopexy in 3 dogs with UBR. Overall,  
61 IOMT procedures were performed because 20 dogs  
had bilateral perineal hernia. Both sides of the hernia  
were repaired during the same anesthetic episode. A  
rectal examination was performed immediately after  
completion of the procedure to ensure that the support  
of the rectal wall had been reestablished and that no  
sutures had penetrated the rectal lumen.

All dogs that underwent surgery before November  
2004 were treated with IOMT alone. All dogs that un- 
derwent surgery after December 2004 were treated with  
LapIOMT, with the exception of 2 dogs that underwent  
IOMT alone after December 2004 for financial reasons. This  
sequential distribution of surgical procedures was re- 
lated to the introduction and systematic use of LapIOMT  
after December 2004 in our hospital.

In dogs without UBR, no significant difference  
was identified between IOMT and LapIOMT treatment  
groups for age (P = 0.44), body weight (P = 0.07), du- 
ration of clinical signs (P = 0.97), and prevalence of  
unilateral versus bilateral perineal hernias (P = 0.07). In  
dogs with UBR, there were no significant differences  
between IOMT and LapIOMT groups for age (P = 1.00),  
body weight (P = 0.30), duration of clinical signs (P =  
0.17), and prevalence of unilateral versus bilateral peri- 
nal hernia (P = 0.20; Table 1).

Necrosis of the urinary bladder wall was not identi- 
fied in any dog. For the 7 dogs with a UBR that underwent  
IOMT, the urinary bladder was successfully repositioned  
intra-abdominally during the perineal stage after surgical  
perineal cystoscopy. For dogs in the LapIOMT group, a  
median laparotomy was performed, the caudal abdomi- 
nal cavity was inspected, and the organs displaced into  
the perineal hernia were repositioned. In 3 dogs with  
UBR, the urinary bladder was repositioned by an assis- 
tant applying external manual pressure on the perineal  
area or by the surgeon pulling on it from the perineal  
cavity, and a cystopexy was performed.

A colopexy was performed in 18 dogs in the no- 
UBR group. A gentle cranial traction was exerted on  
the colon until the assistant perceived tension in the  
rectum. The descending colon was fixed to the ventral  
third of the left abdominal wall. A combination colo- 
pyx and cystopexy was performed in 3 dogs. Cysto- 
pexy was always performed after completion of the col- 
opexy. Both colopexy and cystopexy were performed  
by use of incisional techniques and 3-0 or 4-0 polydiox- 
anone® sutures in a simple continuous pattern.  
The IOMT stage was performed 24 to 48 hours after the  
initial laparotomy stage.

Omentalization of the prostate for an intraprostatic  
cyst was performed in 1 dog. One other dog underwent  
partial resection of a paraprostatic cyst with omental- 
ization of the remaining portion. Both of the afore- 
mentioned dogs had UBR.

Postoperative care—No intraoperative compli- 
cations were identified in either group. The median  
duration of hospitalization for all dogs was 5 days (range, 2  
to 6 days) and was not significantly (P = 0.10) different  
between the no-UBR and UBR groups. Within the no-  
UBR group, the median duration of hospitalization for  
the 13 dogs that underwent IOMT was 3 days (range, 3  
to 4 days), which was significantly (P < 0.001) lower  
than for the 18 dogs that underwent LapIOMT (5 days;  
range, 5 to 6 days). Within the UBR group, the median  
duration of hospitalization for the 7 dogs that under- 
went IOMT was 3 days (range, 2 to 4 days), which was  
significantly (P = 0.01) lower than that for all 3 dogs  
that underwent LapIOMT (5 days). Postoperative treat- 
ments included cepha lexin (n = 41 dogs), meloxicam  
(37), low-residue diet (39), and stool softener (35).

Postoperative complications developed in 9 dogs.  
Five dogs with no UBR that underwent LapIOMT had  
tenesmus, as did 1 dog with no UBR that underwent  
IOMT, 1 dog with UBR that underwent IOMT, and 1  
dog with UBR that underwent LapIOMT. Urinary in- 
continence, which developed in 1 dog with UBR that  
underwent LapIOMT, began after the laparotomy stage  
(combination colopexy-cystopexy) had been comple- 
eted and improved without medical treatment; urinary  
continence was regained 2 months following surgery.  
There were no significant differences in the incidence  
of postoperative complications between the UBR (3/10)  
and no-UBR (6/31) groups (P = 0.66) or between the  
IOMT (2/20) and LapIOMT (7/21) groups (P = 0.13). In  
the no-UBR group, the rates of postoperative compli- 
cations were not significantly (P = 0.36) different be- 
tween the IOMT (1/13) and LapIOMT (5/18) groups. In  
the UBR group, the rates of postoperative complications  
were not significantly (P = 0.18) different between the  
IOMT (1/7) and LapIOMT (2/3) groups.

Long-term function results—The median duration  
of follow-up was 53 months for all dogs (range, 6 to 88  
months). Median follow-up intervals were not signifi- 
cantly (P = 0.16) different between the no-UBR (41  
months; range, 8 to 88 months) and UBR (60 months;  
range, 6 to 67 months) groups. Median follow-up time  
significantly (P < 0.001) longer for dogs treated by  
IOMT (60.5 months; range, 8 to 88 months), compared  
with dogs treated by LapIOMT (34 months; range, 6 to  
57 months).

Thirty-two (78%) dogs had complete resolution of  
their clinical signs related to perineal hernia 5 years af- 
after surgery (Figure 1). The 9 dogs that were not free of  
clinical signs 5 years after surgery, all of which had per- 
sistent tenesmus, included 6 dogs in the no-UBR group  
(1 dog treated with IOMT and 5 treated with LapIOMT)  
and 3 dogs in the UBR group (1 dog treated with IOMT  
and 2 treated with LapIOMT).

Four of the 9 dogs that had a return of clinical signs  
also had perineal swelling on the side that had under- 
gone surgery, and rectal examination confirmed peri- 
nal hernia recurrence. All 4 dogs were in the no-UBR  
group. One dog was treated with IOMT, and the hernia  
recurred 2 months after surgery. The other 3 dogs were
treated with LapIOMT and had a recurrence 1, 2.5, and 6 months after surgery. For these 4 dogs, the owners declined new surgical intervention and opted for medical treatment (enema and hyperdigestible nutrition). Five of the 9 dogs with persistent tenesmus had no evidence of recurrence of perineal hernia detected during rectal examination. Additional diagnostic work-up to investigate persistent tenesmus was declined by the owners and medical treatment, as described, was provided.

No significant ($P = 0.68$) differences were identified in median DFI between the UBR and no-UBR group (Figure 2). The median DFI was significantly ($P < 0.001$) shorter in dogs that underwent LapIOMT than in those that underwent IOMT (Figure 3).

**Discussion**

Results of the present study suggested that UBR was not significantly associated with an increase in the incidence of postoperative complications and had no effect on the long-term outcome in dogs that underwent surgical treatment for perineal hernia. The technique used to correct the hernia did not have an effect on the likelihood of postoperative complications. However, performance of a laparotomy for a colopexy or cystopexy in addition to IOMT appeared to be detrimental in the long term. Long-term follow-up is important when evaluating the success rate of a surgical technique, given that recurrence of perineal hernia has been documented up to 4 years after surgery. The median duration of follow-up in our study was 53 months, and 78% of dogs were free of clinical signs related to perineal hernia 5 years after surgery.

The sample of dogs in our study was similar to that used in other studies with regard to signalment, duration of clinical signs before surgery, clinical signs at the time of initial evaluation, and clinicopathologic findings. The prevalence of UBR in our series was 24%, which was similar to that in other reports (frequency of 18%, 20%, 29%, and 29%). Dogs with UBR were significantly less heavy and older than dogs without UBR. Although this latter finding was not well understood, 1 possibility is age-related hormonal imbalances. An imbalance in estrogen and testosterone concentrations and a decrease in the number of androgen receptors in aging testes have been proposed to explain weakening of the muscles of the pelvic diaphragm. Prostatic disease was present in 47% of the dogs in our study, which is within the range in other studies, in which the prevalence was 11% to 51%.

Urinary bladder retroflexion was not associated with an increase in the incidence of postoperative complications and had no effect on the long-term outcome. Our results were in agreement with those of a previous study in which UBR was not significantly associated with development of postoperative complications. Urinary bladder retroflexion is reportedly a negative prognostic indicator in dogs with perineal hernia. This comorbidity was identified in a previous retrospective study involving 100 dogs with perineal hernia with a mortality rate of 30%. Urinary bladder retroflexion increases the risk of ischemia and necrosis of the urinary bladder wall. Urinary bladder necrosis was not detected in the study dogs. Also, UBR increases the risk of urinary tract obstruction, leading to postrenal azotemia and urinary bladder atony. Urinary bladder necrosis is reportedly associated with prolonged distension can result in a transient or permanent postoperative urinary incontinence. Urinary incontinence has previously been identified in 4% to 8% of dogs with peri-
neal hernia. One dog in our study developed postoperative urinary incontinence after LapIOMT, whereas no dysuria developed in the preoperative period, despite a retroflexed urinary bladder. Urine retention might have occurred following cystoctxy through modification of the position of the bladder neck and interference with the urinary bladder's ability to contract.

In our study, 24 to 48 hours were maintained between the initial laparotomy stage and perineal stage of surgical treatment, explaining the longer duration of hospital stay in dogs treated with LapIOMT. This approach required anesthesia on 2 occasions. Another option would have been to use anesthesia only once; however, this would involve a longer surgical duration and require that dogs be positioned initially in dorsal recumbency and then be rotated into ventral recumbency to allow for IOMT.

Recommendations are to perform cystoctxy prior to perineal herniorrhapsy to stabilize the urinary bladder and prevent recurrence of UBR. Recurrence of bladder retroflexion did not happen in our study in the dogs treated with and without cystoctxy. In a retrospective study involving 61 dogs with perineal hernia treated only with perineal herniorrhaphy, recurrence of the retroflexion was not encountered in any of the 12 dogs with UBR at the time of diagnosis. In another retrospective study of 100 dogs treated with IOMT alone for perineal hernia, only 1 of the 13 dogs with UBR developed recurrence of urinary bladder retroflexion within 5 days after surgery.

The urinary bladder was successfully repositioned after perineal surgical cystocentesis in the group of dogs with UBR that were treated with only IOMT. No laparotomy was needed, and no intraoperative complications were encountered, suggesting that perineal surgical cystocentesis with manual pressure to reposition the urinary bladder was an effective and safe method. The urinary bladder could also be drained by catheterization or by percutaneous perineal cystocentesis.

Use of coloctxy for treatment of perineal hernia in dogs has been reported. Decreasing the rectal diameter, coloctxy was suggested as a means to limit the accumulation of feces in a dilated rectum and subsequently pressure on the pelvic diaphragm. Coloctxy plus IOMT was performed in 21 dogs in our study. Seven dogs treated with this protocol had persistent tenesmus at the time of the study. Three had recurrence of perineal hernia, and 4 had persistent tenesmus without any evidence of perineal hernia recurrence. Because no diagnostic work-up was conducted at the final follow-up evaluation in these 4 dogs to investigate the cause of the tenesmus, the cause remained unknown. Several factors, including recocolitis, rectal neoplasia, parasitism, prostom ages, and urinary tract infection, are reported causes of persistent tenesmus and were not excluded in the study dogs. Furthermore, although no postoperative tenesmus was identified after coloctxy for the treatment of rectal prolapse in dogs in study, the influence of coloctxy on colonic motility in those dogs remained undetermined.

Two coloctxy techniques have been described: a simple suture technique and an incisional technique. Both techniques result in equally successful outcomes.

Laparoscopic coloctxy has also been reported but is not recommended. In the study dogs, the incisional coloctxy technique was used. Our results failed to indicate any significant advantages of coloctxy in terms of postoperative complications rates and long-term outcome. Presumably, it was because coloctxy has been reported for treatment of recurring rectal prolapse in dogs and none of the study dogs had a rectal prolapse. Also, it is unknown how long coloctxy is able to maintain the initial tension applied at the time of surgery. Rectal abnormalities associated with perineal hernia were likely the result of the weakness of the pelvic diaphragm and not a causal displacement of the colon. Therefore, coloctxy is not appropriate for the treatment of perineal hernia, unless a rectal prolapse is present. An appropriate repair of the pelvic diaphragm is paramount for a positive long-term outcome.

One limitation of the present study was its retrospective nature. A randomized controlled clinical trial would be more appropriate to evaluate the effect of various surgical techniques on the outcome. In our study, dogs with perineal hernia were allocated to receive one surgical technique or another on the basis of the time of initial evaluation. Experience of the surgeon could have made a difference in the outcome in favor of LapIOMT. Another potential source of error was the lack of clinical examination for each dog at the time of the last follow-up. In the authors' opinion, observation of defecation by the owners is also an effective method to assess functional outcome and whether the hernia recurred. Also, only 3 dogs with UBR had a cystoctxy, which made it difficult to evaluate the complication rate associated with a cystoctxy in this group. A barium enema was not performed in any dog to further characterize the nature of the rectal abnormalities. In a previous study, 100% of dogs with a perineal hernia had a rectal deviation and none of the dogs had a diverticulum.

Urinary bladder retroflexion did not significantly increase the incidence of postoperative complications and had no effect on the long-term outcome. The use of IOMT alone for perineal hernia repair may be recommended for clinical use because LapIOMT offered no clear advantage.

References


