PREPUBIC MINILAPAROTOMY AS THE SURGICAL APPROACH IN TREATMENT OF PROSTATE DISORDERS IN DOGS. A CADAVER STUDY

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Abstract

The aim of the study was to assess the prepubic minilaparotomy approach in the surgical treatment of prostatic disorders in dogs. The technique of a limited approach to the prostate was developed on the fresh cadavers of 14 intact adult male dogs, diversified in regard to size and body weight. The abdominal cavity was opened in midline, from the right-sided prepubic parapenile incision. The cut was limited to 7 cm. Afterwards, it was expanded by self-retaining retractors: Gelpi, Weislander, Finnochetto Baby, and Adson. Finnochetto Baby and Gelpi retractors used in pairs enabled an adequate exposition of the prostate in small dogs. The Finnochetto Baby retractor enabled an adequate exposition of the prostate in medium dogs and the Adson retractor - in large and giant dogs. The Weislander and Gelpi retractors used individually did not allow for sufficient access to the prostate in any group of the cadavers. Prepubic minilaparotomy can be a useful surgical approach in the treatment of prostatic disorders in dogs. It can be used especially for minor surgical procedures, e.g. sampling of large tissue specimens for histopathological examination, partial prostatectomy, or treatment of intraparenchymal cavity lesions.

Key words: dog, prostate, minilaparotomy.

The conventional surgical access to the prostate in dogs requires the wide opening of the abdominal cavity by incision from umbilicus to pubic symphysis. In order to limit traumatism of surgery of the prostate in humans, attempts are made to treat prostatic disorders using minimally-invasive techniques, e.g. laparoscopic or endoscopic methods (2). So far, only limited reports regarding the performance of endoscopic (6) or laparoscopic procedures of prostatic disorders in dogs have been described (4). Such procedures require a great experience in performing surgical procedures in a restricted area. In addition, in the case of veterinary medicine, the costs of purchase of the appropriate instrumentation have a considerable significance.

A minilaparotomy can be an alternative to laparoscopic surgery. Nakagoe et al. (8) have defined minilaparotomy as the shortest possible incision of the abdominal wall that enables to conduct the intended operation. In human medicine, many studies comparing laparoscopy with minilaparotomy have been published, e.g. pelvic lymphadenectomy (7), prostatectomy (10), and cholecystectomy (12). The authors achieved similar effects using both methods, revealing that minilaparotomy is much cheaper and simpler to perform. The number of intraoperative complications was also lower in case of minilaparotomy, which was connected with the necessity of having a great experience in performing laparoscopic surgery.

So far in a small animal surgery, minilaparotomy has been utilised for such surgical procedures as: replantation of ectopic ureters (13), gastropexy (11), cystostomy (1), and biopsy of the urinary bladder (9). In each of the mentioned cases, minilaparotomy enables an effective performance of the operation without extensive and excessive traumatisation of the patient’s tissues.

So far, the usefulness of a limited access to the abdominal cavity in the surgical treatment of prostatic disorders in dogs has not been published in the literature. Therefore, the aim of the study was to assess the prepubic minilaparotomy approach in the surgical treatment of prostatic disorders in dogs.

Material and Methods

The technique of a limited access to the prostate was developed on the fresh cadavers (up to 2 h after death) of 14 intact adult male dogs, diversified as regards to size and body weight (b.w.). Cadavers of five German shepherds (37-52 kg b.w.) and of nine mongrel dogs (8-52 kg b.w.) were used. The dogs died or were...
euthanised due to reasons other than prostatic disease or pelvic trauma. The dogs were divided into four groups: C1 – small, 8-10 kg b.w. (n=3); C2 – medium, 11-25 kg b.w. (n=3); C3 – large, 26-45 b.w. (n=5); C4 – giant, 46-52 b.w. (n=3).

During rectal and transabdominal ultrasound examination of the prostate, its shape and localisation were estimated. After the preparation of the cadavers (shaving of the abdomen and washing the skin with 70% ethanol), they were placed in dorsal recumbency. The preputium was drawn to the left and stabilised by a towel clamp. The abdominal cavity was opened in midline, from the right-sided prepubic parapenile incision. The cut was limited to 7 cm (Fig. 1).

Results

In all dogs, the prostate had a regular shape and was localised cranially to the pubic brim.

In dogs from group C1, Finnochetto Baby and Gelpi retractors used in pairs enabled an adequate exposition of the prostate (Fig. 2). In dogs from group C2, the Finnochetto Baby retractor enabled an adequate exposition of the prostate (Fig. 3). In dogs from groups C3 and C4, the Adson retractor enabled an adequate exposition of the prostate (Fig. 4). The Weislander and Gelpi retractors used individually did not allow for an adequate access to the prostate in any group of the cadavers. They moved inside the wound during the examination of the prostate and gave the wound a rhomboid shape (Fig. 5).

**Fig. 1.** Prepubic minilaparotomy – dashed line, * - right preputial artery and vein

Afterwards it was expanded by self-retaining retractors:
- Adson (with movable arms): total length - 320 mm, total blade width - 35 mm;
- Finnochetto Baby: total length - 100 mm, total blade width - 31 mm;
- Gelpi: total length - 130 mm, total blade width - 2.5 mm;
- Weislander (sharp): total length - 130 mm, total blade width - 18 mm.

Each type of retractor was used on each dog. The Gelpi retractors were used individually and in pairs. After retraction of the wound, the paraprostatic fat was separated in the midline and then it was drawn aside to expose the prostate. The prostate was palpated and access to its abdominal, cranial, caudal, and lateral surfaces was evaluated. The results obtained were described as adequate or inadequate: adequate - free access to abdominal, cranial, caudal, and lateral surfaces of the prostate; inadequate - free access to abdominal, restricted or lack of access to cranial, caudal, and lateral surfaces of the prostate.

**Fig. 2.** The Gelpi retractors in pairs in a small dog (group C1). Adequate exposition of the prostate is well visible (head on the left).

**Fig. 3.** Finnochetto Baby retractor in a medium dog (group C2). Adequate exposition of the prostate is well visible (head on the left).
In the cadaver examination, the appropriate retractors for different dogs with respect to their size and body weight were tailored. Four types of self-retaining retractors, available in the Clinic were used. Finnochetto Baby and Gelpi retractors appeared to be the most useful in small dogs (group C1). However, in order to obtain a sufficient opening of the operative wound, it was necessary to use two Gelpi retractors, which were placed at the cranial and caudal ends of the wound. A Finnochett Baby retractor enabled an adequate access to the prostate in medium dogs (group C2). In large and giant dogs, the Adson was the retractor of choice (groups C3 and C4).

Weislander and single Gelpi retractors were less useful because they moved inside the wound during the prostate examination. In opposition to Finnochett Baby, pairs of Gelpi and Adson gave the wound a rectangular shape, whereas single Gelpi or Weislander retractors gave the wound a rhomboid shape. A rectangular shape facilitated an approach to the prostate, especially to its cranial and caudal margins.

The choice of the side of the penis, at which the incision was made (right-sided parapenile cut), came from the fact that we are right-handed. It was deemed that it would be easier for right-handed persons to make surgical incisions at the right side. It is supposed that a left-handed person would choose the other side of the penis.

The choice of fresh cadavers (up to 2 h after death) allowed reflecting, in the best possible way, the tension of the operated tissues in live, generally-anaesthetised dogs. Cooled or frozen cadavers would be much more rigid, which could negatively influence the applied surgical technique and the choice of appropriate self-retaining retractor.

Prepubic minilaparotomy can be a useful method of surgical access to the prostate in dogs, especially for minor surgical procedures, for example, sampling of large tissue specimens for histopathological examination, partial prostatectomy, or treatment of intraparenchymal cavity lesions. In case of major procedures, for example, total prostatectomy there is a limited access to the dorsal part of the prostate, urinary bladder, and pelvic part of urethra, thus, this kind of operations should be performed via a conventional surgical approach. The second limitation for the use of prepubic minilaparotomy relates to location of the prostate. Owing to the small dimensions of operative field, the best access to the prostate can be achieved when it is located cranially from pubic symphysis.

**Discussion**

Minilaparotomy is defined as the shortest possible incision of the abdominal cavity wall that enables to conduct the intended operation. Its length amounts to 2.5–10 cm (average 7 cm) (3, 5, 7, 8, 10, 11). An incision shorter than 5 cm is useful during procedures where organs intended to be operated can be dislocated outside the abdominal cavity (3, 13).

Performing a minilaparotomy does not require a special instrumentation and a long lasting surgical training. Due to the small dimensions of the surgical incision, wide opening of the wound margins is necessary (3, 11, 13). Retractors are commonly used to make a wider view into an operative wound. Using hand-held retractors is usually connected with engaging an additional assistant, who only attends to these instruments. It decreases the work comfort of surgeons performing the operation and limits the operative field. The solution to these problems can be the use of self-retaining retractors, which keep themselves in the operative wound.

**References**


