

## Comparative study of pyloromyotomy by laparoscopic and conventional surgery in dogs

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### Summary

Pyloromyotomy is a procedure to increase the diameter of pyloric region, routinely performed during pyloric stenosis to prevent delayed emptying of stomach content. The aim of this study was to evaluate the pyloromyotomy by conventional and laparoscopic techniques. Ten adult healthy dogs were used. Five animals underwent the pyloromyotomy by conventional and the same number laparoscopic technique. The clinical radiological and laparoscopic results of two techniques revealed that both were successive for achieved this purpose, but the laparoscopic pyloromyotomy characterized by small abdominal incision minimal adhesion and rapid healing.

### دراسة مقارنة لتوسيع المنطقة البوابية بالجراحة المنظارية والتقليدية في الكلاب

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#### الخلاصة

تم فتح المنطقة البوابية للمعدة لغرض زيادة قطرها , وهذا يستخدم عند وجود تضيق في المنطقة البوابية لمنع تأخر تفريغ محتويات المعدة ان الهدف من هذا الدراسة لتقييم كفاءة الجراحة التقليدية والمنظارية في توسيع المنطقة البوابية . استخدام عشرة كلاب بالغة و قسمت الى مجموعتين متساويتين . المجموعة الاولى اجري توسيع المنطقة البوابية بالجراحة التقليدية والثانية باستخدام المنظارية اظهرت النتائج السريرية و الشعاعية و المنظارية بأن كلا الطريقتين ناجحة لاجراء هذا العملية ولكن تتميز الجراحة الناظورية بصغر فتحت البطن و قلت الالتصاقات و سرعة الالتئام.

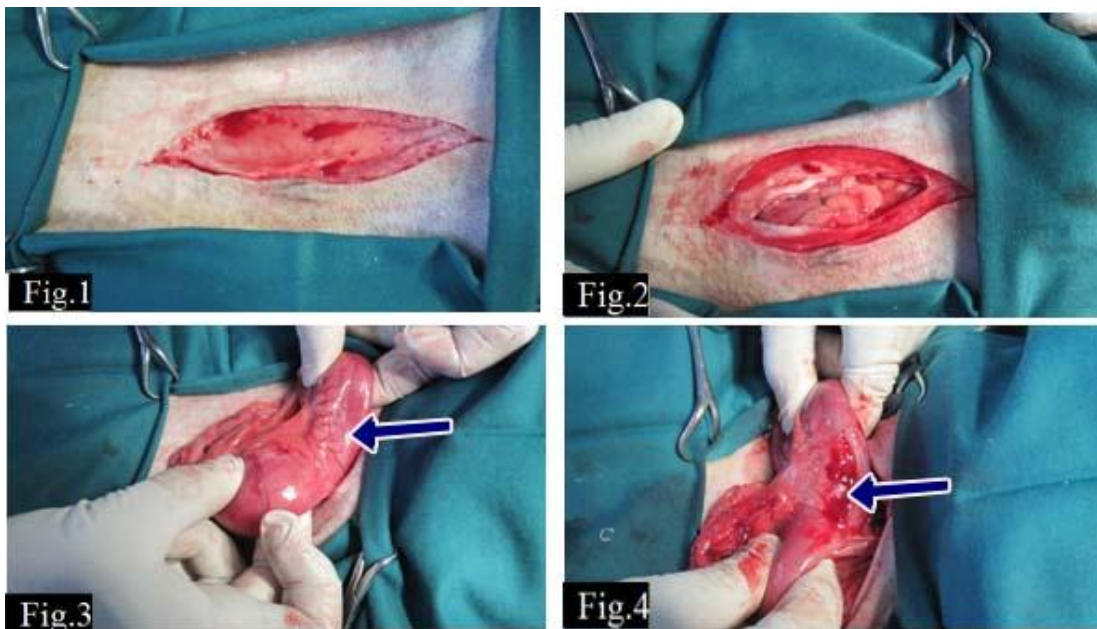
### Introduction

Pyloric stenosis is a narrowing of the pyloric canal resulting in partial or complete obstruction to the outflow of ingesta from the stomach to the small intestine. Congenital antral hypertrophy caused by hypertrophy of pyloric circular smooth muscle or mucosa is most commonly in the Boston terrier and Boxer. The principle clinical feature of the condition is vomiting starting immediately after weaning with the introduction of solid food (1). Antral pyloric hypertrophy syndrome, also referred to as pyloric stenosis and chronic hypertrophic pyloric gastropathy, occur either as a congenital condition or more frequently as an acquired disorder(2). Chronic hypertrophic pyloric gastropathy was diagnosed using ultrasound; an evenly thick hypoechoic layer surrounding the pyloric lumen was visualized ultrasonographically in dogs 1 or 2 chronic hypertrophic pyloric gastropathy (3). The definitive treatment of pyloric stenosis with surgical pyloromyotomy, dividing the muscle of the pylorus to open up the gastric out let. This is a relatively straight forward surgery that can possibly be done through a single incision or laparoscopically , through several tiny incisions , depending on the surgeon experience and preference (4 ). The object of this study was to evaluate the complications of pyloromyotomy with conventional and laparoscopic techniques.

### Materials and Methods

Ten adult dogs 2-3 years in aged and 10-13/kg B.W of both sexes were used. The animals were housed in small animal's house of department of Surgery and Obstetrics, College of Veterinary Medicine. The dogs were dewormed by antihelminths drug. The animals were divided into two equal groups, conventional and laparoscopic groups. The animals were fasted for 24 hours of foods and 12 hours of water before operations. The site of operation in between xiphoid cartilage and umbilical area and laterally as far as possible was prepared aseptically. General anesthesia induced by a mixture of ketamine 15 mg/kg B.W and xylazine 5mg/kg B.W intramuscularly, and midline laparotomy extended between xiphoid

cartilage into cranial of umbilical area is made (Figures 1 and 2). The stomach was exposed and the pyloric region was elevated by Babcock forceps after partial tearing of gastro hepatic ligament (Figure 3). Then 3-4cm incision is made on a vascular area of pyloric, in which the pylorus is a mid-point of incision (Figure 4). The incision extended through tunica serosa and muscular layer, the muscular layer cut and separated by scissors, care must be taken not to cut through mucosa. The tunica mucosa was protruded out of incision (5). The abdominal wall was closed routinely. While in laparoscopic group a tiny incisions, 1cm on umbilical area for introduced of a telescope through port (10mm) and another two ports (5mm) for introducing of grasper forceps and scissors. The pyloric area was hold by forceps (Figures.5, 6 and 7) and the pyloromyotomy was achieved similar as conventional group by using laparoscopic scissors. The tiny abdominal three incisions were closed routinely. Penicillin – streptomycin at a dose 10.000 IU and 20 mg / kg .B.W was administered intramuscular, respectively for 3 days post operation. In both groups skin stitch was removed after ten days. Radiograph has been taken pre-operation and 15 days post operation after administration of saturated barium sulphate on both groups. Laparoscopy was used on both groups for examine of animals at 15 days post operation in order to evaluate the adhesions between pyloromyotomy incision and adjacent structures and also the degree of healing of the pyloromyotomy incision.

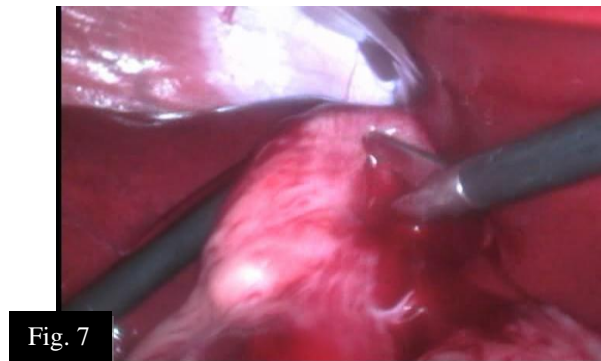
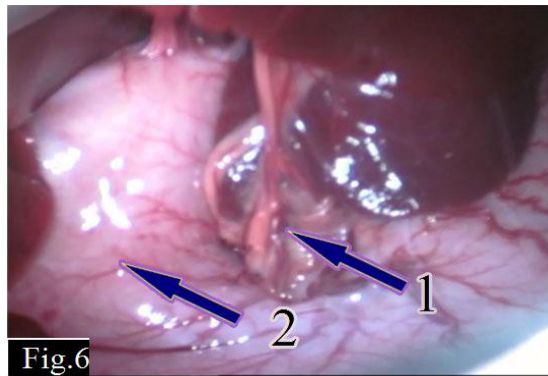
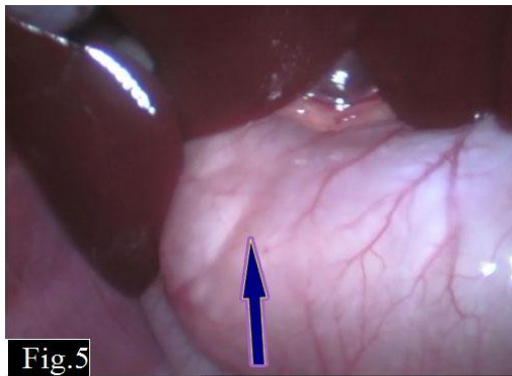


**Figure, 1: Midline incision between xiphoid cartilage and umbilical area.**

**Figure, 2: Exposure of internal abdominal organs.**

**Figure, 3: Shows less vascular area of pyloric region (arrow).**

**Figure, 4: Shows, incision through serosa and muscular layer on pyloric region (arrow).**



**Figure, 5: Shows less vascular area of pyloric region laparoscopically (arrow).**

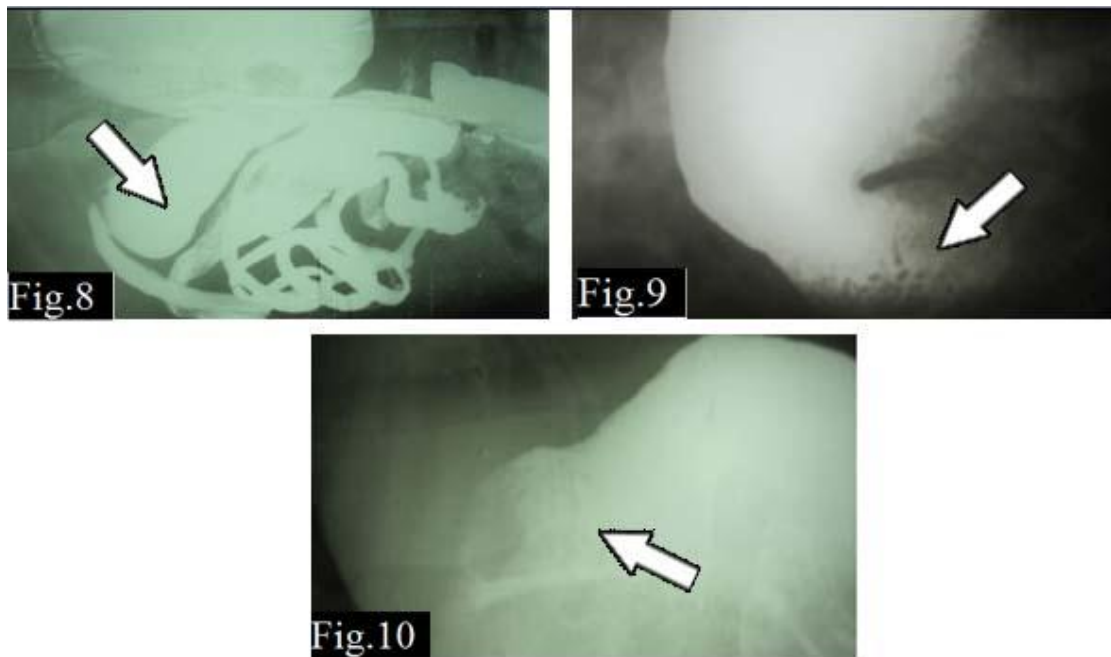
**Figure, 6: Shows hepatogastric ligament (arrow, 1) and pyloric region (arrow, 2) laparoscopically.**

**Figure, 7: Shows, incision through serosa and muscular layer on pyloric region (arrow).**

### Results

The clinical parameters involved rectal temperature, respiratory rate and heart rates were within the normal level in all experimental animals, especially in laparoscopic group. On other hands, the animals activity and appetite, were not altered in laparoscopic group, while in conventional group have less appetite and limited activity during 3-4 days postoperatrion. Pneumoperitoneum at pressure (8-10) with CO<sub>2</sub> was succeeded in laparoscopic group, this allow maneuvers free movement of laparoscopic instruments to reach a surgical site of pyloric region. And the laparoscopic pyloromyotomy was characterized by shorter surgical time, lower infection and rapid healing, when compared with conventional group. Intra-abdominal mild adhesion occurs between pyloromyotomy site and adjacent tissues in conventional group, but less in laparoscopic group.

There was slight swelling of the sites of inserted ports at 3 postoperative day, while in conventional group, the large midline skin incision between xiphoid cartilage and umbilical area was associated with swelling along the incision, which disappeared 4-5 days postoperative. Also this large incision was required about 10-12 days to heal. The radiographic gastrography with contrast media (barium sulphate) preoperation and 15 postoperative days of both groups, were revealed that , there is easily passage of stomach contents into small intestine through pyloric region before operation (Figure,8),also this process was more promenanance at 15 days post operation in both groups (Figures,9 and 10).



**Figure, 8:** Dorsoventral radiograph 2 hours after barium sulphate was given, shows pyloric region (arrow) and gastric contents emptying into small intestine through pyloric canal, inpreoperation animals.

**Figure, 9:** Dorsoventral radiograph 2 hours after barium sulphate was given, shows dilation of pyloric region after 15 days postoperation on conventional group.

**Figure, 10:**Dorsoventral radiograph 2 hours after barium sulphate was given, shows dilation of pyloric region after 15 days postoperation on laparoscopic group.

### Discussion

The clinical parameters of laparoscopic group was coincided with finding of another author (6), who mentioned that, there was no alter physical parameters before and after laparoscopic cholecystectomy in dogs. The limited activity and less appetite after operation in conventional group, this may be due to large abdominal incision and rough manipulation during operation, this results agreed with (7).Also (8) described that the laparoscopic technique has largely supplanted the traditional open repairs, which involved a tiny circular incision around the navel, compared to the older open techniques, the complication rate is equivalent, except for a markedly lower risk of wound infection. The pneumoperitoneum was used in this study at pressure (8-10) mmHg was created a good visualization of abdominal organs and provided good surgical field.

Mild adhesion formation between the pyloric region and other abdominal organs was clearer in conventional group, compared with laparoscopic group. These observations may be due to rough manipulation of tissues, bleeding and tissue dryness during operation, these results was supported by (9), who mentioned that there is more adhesion on the conventional cholecystectomy than laparoscopiccholecystectomy. .The laparoscopic pyloromyotomy was characterized by short surgical time, lower infection, rapid healing, when compared with conventional pyloromyotomy. Also in laparoscopic pyloromyotomy technique not needed to tear of gastro hepatic ligament compared to conventional technique which it done to expose of pyloric region. The radiographic pictures with contrast media, preparation and 15 postoperative days of both groups were indicated that, there is succeeded to achieve pyloromyotomy by both techniques, without leak from pyloromyotomy site. In addition to that the radiographs show the diameter of pyloric canal in post operation more than in preoperation. In conclusion of this study indicated that, the laparoscopic pyloromyotomy was regarded as good methods for repair of pyloric stenosis, which associated with small abdominal incision, earlier retained into normal activity, and less pain, when compared with conventional technique.

### References

- 1-Ackerman L (2011). Digestive system disorder, chapter 5 In the genetic connection 2nd ed. Lakewoodcoloradio. P: 80.
- 2-Tams TR(2003). Diseases of the stomach, chapter 5.In handbook of small animal gastroenterology 2<sup>nd</sup> ed. Saunders .p:184.
- 3-Biller DS, PartingtonBp, Miyabayashi T and Leveille R. (1994) .Ultrasonographic appearance of chronic hypertrophic pyloric gastropathy in the dog. Vet. Radio.ultrasound 35(1) : 30-33
- 4-<http://www.medpagetoday.com/swrgery/thoracic surgcry/12497>
- 5-Dulisch ML (1984).Gastrotomy, chapter 12.In current techniques in small animal surgery.BojrabMJ 2<sup>nd</sup> ed. Lea and Febiger, Philadelphia. Pp:158-160.
- 6-Al-Badrany MS(2006). Cholecystectomy and liver biopsy achievement by taparoscopy in dogs.College of veterinary Medicine, MosulUniversity. Ph D dissertation.
- 7-Nakajima J, Sasaki A, Toru-obuchi T, Baba IS Nittaand H, and Wakabayashi C. 2009.laparoscopic subtotal cholecystectomy for severe cholecystitis. Surg. Today 39(10):870-875.
- 8-Sola JE and Neville (2009). Laparoscopic vs open pyloromyotomy : a systematic review and meta-analysis J.pediatr. Surg. 44 (8):1631-7.
- 9-Szabo GY, Miko P, Nagy E,Brath E and Gamal En (2007). Adhesions formation with open versus laparoscopic cholecystectomy: an immunologic and histologic study, surg. Endosc. 21:231-257.