

Management of the "Normal" Appendix during Laparoscopy for Right Iliac Fossa Pain

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ABSTRACT

The advent of laparoscopic surgery raises the question of what to do with a normal appendix at laparoscopy for right iliac fossa pain of uncertain origin. We assess the views of all members of the Association of Laparoscopic Surgeons of Great Britain and Ireland (ALSGBI) via means of a survey. Of 135 responses to the questionnaire 61% of surgeons remove a macroscopically normal appendix and 26% do not. 13% of surgeons do not commit. Of those removing a normal appendix the most common reasons given were the possibility of endoluminal appendicitis (87%) and avoiding future confusion as to whether the appendix had been removed (64%). When asked whether there were sufficient guidelines on this topic 68% said no, 6% said yes and 5% were unsure. 16% said that it was a matter for common sense rather than guidelines and 5% felt that the evidence was contradictory. This study highlights a lack of consensus in the management of a normal appendix found at laparoscopy for right iliac fossa pain and demonstrates most surgeons feel guidelines would be useful. In the absence of guidelines the options may be discussed with the patient before operation.

Keywords: Laparoscopic appendectomy, normal appendix, diagnostic laparoscopy

INTRODUCTION

The lifetime risk of developing appendicitis in the USA is 8.6% for men and 6.7% for women.¹ In the era of open appendectomy 15-30% of appendices removed were normal.^{2,3} Scoring systems have been put forward as an aid to diagnosis.⁴ Ultrasound is user dependent and while computed tomography may be diagnostic it involves exposure to radiation.

There is a lack of consensus in the literature over what to do with a normal appendix. The main argument for removing a normal appendix is that endoluminal appendicitis may not be recognized at operation leading to concern that an abnormal appendix is left in place. This may result in the need for subsequent appendectomy.^{5,6} Endoluminal appendicitis is reported in 11-58% of apparently normal appendices removed.^{5,7,8} Navez argues that since endoluminal appendicitis is confined to the mucosa it does not cause localized pain and

questions whether there is progression to suppurative appendicitis.⁷

Many patients are unsure as to whether their appendix has been removed. Murphy et al 2001 reported that of 176 patients who had laparoscopy for right iliac fossa pain 61% were under the misapprehension that their appendix had been removed.⁹ They suggest that the removal of a normal appendix adds little to the morbidity of laparoscopy and that the appendix should be removed regardless of its appearance at laparoscopy.¹⁰ This is supported by studies where incidental appendectomy has been performed during total abdominal hysterectomy¹¹ and cystectomy.¹² However other studies report increased complications following the removal of a normal appendix.¹³⁻¹⁷

Data on follow-up of patients who have not had their appendix removed suggest that it is safe to leave a normal appendix in place. Van den Broek et al 2000 reported a prospective study of 109 diagnostic laparoscopies for suspected appendicitis where the appendix was left in place if it looked normal. There were 9 readmissions with only one requiring an appendectomy.¹⁸ Van Dalen et al 2003 reported a prospective randomised study of 63 patients with 10 years follow-up. Patients found at laparoscopy to have a normal appearing appendix were randomised to laparoscopy + open appendectomy or laparoscopy only. No patients in the diagnostic laparoscopy group developed appendicitis subsequently.¹⁹ Teh et al 2000 reported that of 41 patients who had laparoscopy alone for a normal appendix 13 continued to have symptoms and 2 eventually had their normal appendix removed.²⁰

In this study we assess the practice of members of ALSGBI and their views on whether guidelines are desirable.

MATERIAL AND METHODS

A literature review was performed using the Pubmed database and searching using the words laparoscopy and normal appendix.

Table 1:

Do you perform laparoscopic appendicectomies?
 Approximately what proportion of these are in females?
 In a patient undergoing laparoscopy for right iliac fossa pain with an uncertain diagnosis, if the appendix appears normal and there is no other pathology do you remove the appendix?
 If yes, is this for any of the following reasons?
 To prevent future appendicitis
 For possible endoluminal appendicitis (inflammation of the mucosa of the appendix with an externally normal appendix)
 To avoid future confusion for the patient as to whether or not they have an appendix
 Other (please specify)
 Do you feel that there are sufficient clear guidelines on this topic?
 If so from what source?

A questionnaire was sent to 588 members of ALSGBI (Table 1)

RESULTS

135 (23%) responded to the questionnaire. 134 answered all questions, of which 98% currently perform laparoscopic appendicectomy. 62% perform laparoscopy for right iliac fossa pain mostly in females and 4% only in females. 4% perform laparoscopy mostly in males and for 28% sex does not affect the decision. 2% were unsure of the sex distribution of their patients.

61% of surgeons remove a macroscopically normal appendix at laparoscopy for right iliac fossa pain of unknown origin and 26% do not. 13% of surgeons do not commit either way.

Of those removing a normal appendix the most common reasons given were the possibility of endoluminal appendicitis (87%) and to avoid future confusion as to whether the appendix had been removed (64%). Some (44%) remove a normal appendix to prevent future appendicitis and 38% gave various other reasons (Table 2).

When asked whether there were sufficient guidelines on this topic 68% said no, 6% said yes²¹ and 5% were unsure. 16% said that it was a matter for common sense rather than guidelines and felt that clinical judgment was needed as opposed to guidelines. 5% felt that the evidence was contradictory making it difficult to issue guidelines.

DISCUSSION

Of those who responded to the questionnaire 98% were currently performing laparoscopic appendicectomy. However only 23% of the population surveyed responded to it. Most often laparoscopy for right iliac fossa pain is performed in women who may have gynecological conditions which can mimic appendicitis.

61% of surgeons always remove the appendix and the most common reason given was the possibility of endoluminal

Table 2: Reasons for removing a [normal] appendix in the groups that always remove or sometimes remove the appendix

Reason	Percent
Endoluminal appendicitis	87
To avoid future confusion as to whether it was removed	64
Prevention of future appendicitis	44
Recurrent pain to clarify diagnosis	7
To remove as a future diagnosis of nonspecific abdominal pain	6
Continuing pain	6
Ease of procedure/Doesn't add to morbidity	5
Patient satisfaction	3
Fecolith giving rise to colic	3
To exclude other pathology	3
Same rationale as open	2
Training of juniors	1
Surgeon more content	1
Possible missed diagnosis	1

appendicitis followed by the avoidance of future confusion as to whether the patient has an appendix. Both these arguments are backed up by data in the literature. However 44% remove an appendix to prevent future appendicitis for which there is no evidence.

68% felt there were no adequate guidelines for surgeons to follow. However since the available evidence is contradictory it does not at present allow the formulation of clear guidelines. The 16% who said that clinical judgment was more important are justified in their view.

This leaves the question of what should be done to satisfy the demand for clear guidelines found in this survey. A large prospective randomized multicenter clinical trial would provide the evidence but would prove logistically difficult and if patients were to be blinded to their operation an accessible data base would be mandatory. Possibly a more feasible study (admittedly with a lower level of evidence) would be a large multicenter study on the long-term follow-up of all patients who have had a normal appendix left *in situ* after diagnostic laparoscopy for right iliac fossa pain as previous similar studies have low numbers of patients making it difficult to form conclusions.¹⁸⁻²⁰ Meanwhile it is suggested that in the absence of guidelines the options are discussed with the patient before the procedure and that they are made fully aware that there are arguments for both removing and leaving the appendix.

In conclusion, this study shows that there is a lack of consensus in the management of a normal appendix found at laparoscopy for right iliac fossa pain and most surgeons feel that guidelines would be useful. In the absence of guidelines the options may be discussed with the patient before their operation as part of the consent procedure.

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REFERENCES

1. Addis DG, Shaffer N, Fowler BS, Tauxe RV. The epidemiology of appendicitis and appendectomy in the United States. *Am J Epidemiol* 1990;132:910-25.
2. Pieper R, Kager L. The incidence of acute appendicitis and appendectomy: an epidemiological study of 971 cases. *Acta Chirugica Scandinavica* 1982;148:45-49.
3. Anderson RE, Hugender A, Thrin AJ. Diagnostic accuracy and perforation rate in appendicitis: association with age and sex of the patient and with appendectomy rate. *Eur J Surg* 1992;158:37-41.
4. Alvarado A. A practical score for the early diagnosis of acute appendicitis. *Ann Emerg Med* 1986;15:557-64.
5. Grunewald B, Kealing J. Should the normal appendix be removed at operation for appendicitis. *J R Coll Surg Edinb* 1993;38:158-60.
6. Wang Y, Reen DJ, Puri P. Is a histologically normal appendix following emergency appendectomy always normal? *Lancet* 1996;347:1076-79.
7. Navez B, Therasse A. Should every patient undergoing laparoscopy for clinical diagnosis of appendicitis have an appendectomy? *Acta Chir Belg* Feb 2003;103(1):87-89.
8. Chiarugi M, Bucciatti P, Decanini L, Balestri R, Lorenzetti L, et al. 'What you see is not what you get'. A plea to remove a 'normal' appendix during diagnostic laparoscopy. *Acta Chir Belg* 2001;101(5):243-45.
9. Murphy SM, Colgan G, O'Neill S, Tanner WA, Keane FBV. Previous laparoscopy in abdominal pain-confusion or clarification. *Ir J Med Sci* 2001;170:28(Abstract).
10. Murphy SM, Tierney S. Letter in *BJS* 2002;89:663-70.
11. O'Hanlan KA, Fisher DT, O'Holleran MS. 257 incidental appendectomies during total laparoscopic hysterectomy. *JSL* 2007;11(4):428-31.
12. Santoshi N, Gaitonde K, Patil N, Goyal A, Srinavas V. Incidental appendectomy during radical cystectomy-Is it necessary? *Urology* 2002;59:678-80.
13. Devereaux DA, McDermott JP, Caushaj PF. Recurrent appendicitis following laparoscopic appendectomy. Report of a case. *Dis Colon Rectum* 1994;37:719-20.
14. Walker SJ, West CR, Colmer MR. Acute appendicitis: does removal of a normal appendix matter, what is the value of diagnostic accuracy and is surgical delay important? *Ann R Coll Surg Engl* 1995;77: 358-63.
15. Riber C, Soe K, Jorgensen T, Tonnesen H. Intestinal obstruction after appendectomy. *Scand J Gastroenterol* 1997;32:1125-28.
16. Gough IR, Morris MI, Pertnikovs EI, Murray MR, Smith MB, et al. Consequences of removal of a 'normal' appendix. *Med J Aust* 1993;1:370-72.
17. Binjen CL, van den Broek WT, Binjen AB, de Ruiter P, Gouma DJ. Implications of removing a normal appendix. *Digestive Surgery* 2003;20(3):215-19.
18. Van den Broek WT, Binjen AB, van Eerten PV, de Ruter P, Gouma DJ. Selective use of diagnostic laparoscopy in patients with suspected appendicitis. *Surg Endos* 2000;14(10):938-41.
19. Van Dalen R, Bagshaw PF, Dobbs BR, Robertson GM, Lynch AC, et al. The utility of laparoscopy in the diagnosis of acute appendicitis in women of reproductive age. *Surg Endosc* 2003;17(8):1311-13.
20. Teh SH, O'Ceallaigh S, McKeon JG, O'Donohue MK, Tanner WA, et al. Should an appendix that looks 'normal' be removed at diagnostic laparoscopy for acute right iliac fossa pain. *Eur J Surg* 2000;166(5):388-89.
21. The Clinical Guidelines Committee, Diagnostic Laparoscopy Clinical Guidelines, Royal College Surgeons Ireland 2005;9.