

**International Journal of Biomedical and Advance Research**

ISSN: 2229-3809 (Online)

Journal DOI: [10.7439/ijbar](https://doi.org/10.7439/ijbar)

CODEN: IJBABN

**Research Article**

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## Role of Laparoscopy in uncertain diagnosis of right lower abdominal pain

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E-mail: [mrinal.tandon@yahoo.in](mailto:mrinal.tandon@yahoo.in)**Abstract**

**Aim:** Aim of the study was to evaluate role of laparoscopy for diagnosis & management of patients with pain in right lower abdomen with uncertain diagnosis.

**Material and Methods:** A prospective study was carried out on 36 patients with right lower abdominal pain who had uncertain clinical diagnosis, whose diagnosis was not established by clinical examination and laboratory investigations at Lata Mangeshkar Hospital, Digdoh Hills, Hingna Road, Nagpur for a period of one year.

**Results:** Total 36 patients were subjected for diagnostic laparoscopy out of which 25 were females and 11 were males. Mean age of presentation was 31.52 years. Out of 36 patients, 27 patients have appendicitis, 2 patients have appendicitis and right ovarian cyst, 1 patient have only right ovarian cyst, 2 patients have pelvic inflammatory disease and in 4 patients no abnormality detected. Appendicitis was found on laparoscopy in 29 patients with 93.1% diagnostic accuracy. In our study, sensitivity, specificity, positive predictive value, negative predictive value and diagnostic accuracy of laparoscopy in acute appendicitis comes out to be 100%, 66.6%, 96.2%, 100% and 93.1% respectively. Out of 36 patients, the sensitivity of Alvarado score comes out to be 46.1 %, specificity 90 %, positive predictive value 92.3 %, negative predictive value 39.1 % and diagnostic accuracy 58.3%. Negative appendectomy was avoided in one male patient out of 11 patients (9.09%) and six female patients out of 25 female patients (24%). The use of laparoscopy as diagnostic tool can cut down unnecessary appendectomies especially in females. In our study, total seven (19.44%) negative appendectomies were avoided. Laparoscopy can detect pelvic inflammatory disease, ovarian cyst in patients of uncertain diagnosis of right lower abdominal pain.

**Conclusion:** Laparoscopy has definite role in evaluation of pain in right lower abdomen with uncertain diagnosis. Diagnostic accuracy, sensitivity, specificity, positive predictive value and negative predictive value are more than Alvarado score in detecting acute appendicitis. It is useful especially in female patients to diagnose pelvic disease and rule out other pathology. With the help of laparoscopy therapeutic intervention can also be done at the same time with its advantages over open appendectomy. We can reduce the no of negative appendectomies. Diagnostic laparoscopy can also be therapeutic with its advantages.

**Keywords:** Laparoscopy, Right iliac fossa pain, Appendicitis

**1. Introduction**

In a surgical practice we frequently encounter patients with right lower abdominal pain, who despite frequent routine examination and all available investigations remain undiagnosed. Almost 36% appendix which are removed are unremarkable[1]. Laparoscopy is very sensitive for diagnosis of appendicitis. It not only detects appendicitis but also avoids negative appendectomies.[2,3,4].

**2. Material and Methods**

A prospective study was carried out on 36 patients with right lower abdominal pain who had uncertain clinical diagnosis, whose diagnosis was not established by clinical examination and laboratory investigations. Our exclusion criteria were patients with palpable lump in right iliac fossa, patients who were unfit for laparoscopic surgery, pregnancy, patients with complicated appendicitis and patients

with definite signs of acute appendicitis on ultrasonography.

**2.1 Statistical Methods:** All variables were analyzed by Fisher exact test.

**3. Observation and results**

Total 36 patients were included. Out of which 25 were females and 11 were males. Age of patients included in this study ranges from 17 years to 65 years. Mean age of presentation was 31.52 years.

**Table 1: Total 36 patients were subjected for diagnostic laparoscopy**

11 Male patients	25 Female patients
10 patients – Appendicitis	17 patients – Appendicitis 2 patients- Appendicitis + right ovarian cyst
1 patient – No abnormality detected	6 patients – 2 patients- PID 1 patient - Right ovarian cyst 3 patient – No abnormality detected

**Table 2: Diagnostic laparoscopic findings**

S. No	Diagnostic laparoscopic findings	No. of patients
1.	Appendicitis	27
2.	Appendicitis + Right ovarian cyst	2
3.	Right ovarian cyst	1
4.	Pelvic inflammatory disease	2
5.	No abnormality detected	4

**Table 3: Procedures done by laparoscopy**

S. No	Procedure done	No. of patients
1.	Diagnostic laparoscopy	36
2.	Laparoscopic appendectomy alone	27
3.	Laparoscopic ovarian cyst puncture + appendectomy	2
4.	Oophorectomy for twisted right ovarian cyst (converted to open procedure)	1
5.	No therapeutic procedure	6

Out of 36 patients, laparoscopic appendectomy done in 29 patients. Out of 29 patients laparoscopic appendectomy alone was done in 27 patients and laparoscopic appendectomy & ovarian cyst rupture done in 2 patients.

**Table 4: Sensitivity, specificity, Positive predictive value, Negative predictive value and diagnostic accuracy of laparoscopic appendectomy**

Total no of patients in which laparoscopic appendectomy done 29	Histopathologically inflamed appendix	Histopathologically not inflamed appendix
Laparoscopic appendectomy alone done in 27 patients	26 patients	1 patient
Laparoscopic appendectomy+ ovarian cyst rupture in 2 patients	0 patient	2 patients

So the Sensitivity, Specificity, Positive predictive value, Negative predictive value and Diagnostic accuracy of laparoscopy were 100%, 66.6%, 96.2% , 100% and 93.1% respectively.

**Table 5: Alvarado score**

Alvarado score	Total no of patients	Total no of patients where laparoscopy revealed appendicitis	Histopathologically inflamed appendix
< 7	23	17	14
≥ 7	13	12	12

**Table 6: Sensitivity, specificity, PPV, NPV and diagnostic accuracy of Alvarado Score ≥ 7**

Alvarado score	Laparoscopically/ Histopathologically inflamed appendix	Laparoscopically/ Histopathologically not inflamed appendix
≥ 7 (Total no of patients in this score is 13)	12	1
< 7 (Total no of patients in this score is 23)	14	9

The Sensitivity, Specificity, Positive predictive value, Negative predictive value and Diagnostic accuracy of Alvarado score ≥ 7 were 46.1 %, 90 %., 92.3 %, 39.1 % and 58.3 % respectively. P value was calculated using Fisher exact test P < 0.05. It is statistically significant. Alvarado score definitely has role as an aid in the diagnosis of appendicitis. Score more than 7 is more sensitive for appendicitis. But it is not 100% accurate. Diagnostic laparoscopy has significant role in diagnosing appendicitis. In this study out of 36 patients, on laparoscopy diagnosis of cause of pain in right iliac fossa was made in 32 patients with 93.1% accuracy. All the specimens were subjected for histopathology. All the specimens were reported having changes of appendicitis on histopathology. In 7 patients (19.44%), there was no evidence of appendicitis on laparoscopy. In our study in 19.44% patients, negative appendectomy was avoided. In male patients 9.09% of negative appendectomies avoided where as in female patients 24% of negative appendectomies avoided.

**4. Discussion**

Right lower abdominal pain often presents a diagnostic problem to the surgeon. In our series 36 patients with pain in right lower abdomen with uncertain etiology, appendicitis was found on laparoscopy in 29 patients with 93.1% diagnostic accuracy. Alvarado score is a scoring system for clinical diagnosis of acute appendicitis. In one study

on 1000 patients with suspected acute appendicitis, the sensitivity of Alvarado score  $\geq 7$  was found to be 87.41%, specificity was 74.39% & positive predictive value was 83.7% [5]. In our study on 36 patients, the sensitivity of Alvarado score comes out to be 46.1 %, specificity 90 %, positive predictive value 92.%, negative predictive value 39.1 % and diagnostic accuracy 58.3 %. Gomes *et al*, in their study showed the sensitivity of laparoscopy in diagnosing appendicitis was 100%, specificity 63.3%, PPV 86.2%, NPV 100% and diagnostic accuracy 84.1% [6].

In our study, sensitivity comes out to be 100%, specificity 66.6%, PPV 96.2%, NPV 100% and diagnostic accuracy 93.1%. The rate of negative appendectomy (removal of a normal appendix in patients with other causes of abdominal pain) is reported between 20% and 30% [7,8]. The use of laparoscopy as diagnostic tool can cut down unnecessary appendectomies especially in females. Leape and Ramenofsky in their study on 32 patients, negative appendectomies were avoided in 37.5% of total patients [3]. The negative appendectomy was reduced by 38%. In our study, total seven (19.44%) negative appendectomies were avoided. Negative appendectomy was avoided in one male patient out of 11 patients (9.09%) and six female patients out of 25 female patients (24%). Laparoscopy has role in evaluation of pain in right lower abdomen with uncertain diagnosis. Laparoscopy allows examination of peritoneal cavity [9] and inspection of pelvic organs for other pathology mainly in young female [10]. In our study, laparoscopy detected PID, ovarian cyst in patients of uncertain diagnosis of right lower abdominal pain. Diagnostic laparoscopy can also be therapeutic with its advantages.

## 5. Conclusion

Laparoscopy has definite role in evaluation of pain in right lower abdomen with uncertain diagnosis. It is safe and effective. Diagnostic accuracy, sensitivity, specificity, positive predictive value and negative predictive value are more than Alvarado score in detecting acute appendicitis. It is useful especially in female patients to diagnose pelvic disease and rule out other pathology. With the help of laparoscopy therapeutic intervention can also be done at the same time with its advantages over open appendectomy. We can reduce the no of negative appendectomies and its complication with the use of diagnostic laparoscopy.

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