

# Perforated Appendicitis - An Experience From A Tertiary Care Center In Kashmir

S Salati, A Rather, S Wani

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## Abstract

Appendicitis is a very common surgical emergency and in spite of advances in medical care, this condition still gets complicated and leads to morbidities and mortalities. Aim: This study was conducted to study the profile of patients treated with perforated appendicitis at the Surgical Department of a tertiary care center in Indian Kashmir. Methods and Materials: The study was conducted retrospectively and cases treated for perforated appendicitis from Jan. 1999 to Dec. 2007 were studied. Results: Over a period of 8 years, 834 patients were treated for appendicitis and out of these, 67 cases had perforated appendicitis. Delay in reporting to expert healthcare was a major factor leading to perforation. Seventy-three per cent of perforated appendicitis cases had a postoperative complication as compared to only 4% in the non-perforated appendicitis group. Conclusion: Perforated appendicitis is associated with significant morbidity and mortality and steps need to be taken to prevent the delayed reporting of patients at expert healthcare facilities.

## INTRODUCTION

Acute appendicitis is the commonest surgical emergency in most of the countries. In spite of major advances in medical sciences, this condition is still associated with complications leading to significant morbidity and mortality. This situation is worse in economically deprived regions where quality healthcare is not easily accessible to all. This study was conducted in one of the three tertiary healthcare facilities in the Indian side of Kashmir valley to study the profile of patients managed for perforated appendicitis over a period of eight years.

## MATERIALS AND METHODS

This study was conducted in the Department of General Surgery of the Medical College of Sherikashmir Institute of Medical Sciences, Srinagar, Kashmir. The records of all the patients managed for perforated appendicitis between Jan. 1999 to Dec. 2007 were studied retrospectively with respect to presenting features, management and outcome. The records were retrieved from a stored data bank of the college. The cases were considered as having suffered from perforated appendicitis only when the respective operation notes confirmed so and non-perforated appendicitis was considered when histopathological analysis of the retrieved specimen proved appendicitis. All the files in which the records were deficient or the cases in which appendices were

normal on histopathological examination were excluded from the study.

## RESULTS

Over the period of 8 years, from Jan. 1999 to Dec. 2007, 834 cases were treated for appendicitis; 188 cases were excluded from the study due to lack of proper records or absence of features of appendicitis on histopathological examination of retrieved specimens. Out of the remaining 646 cases which were included in the study, 574 patients (342 males: 232 females) had appendicitis without perforation and 72 (38 males: 34 females) had perforated appendicitis.

**Figure 1**

Table 1: Profile of patients with non-perforated appendicitis

Age group (yrs)	No.	Positive family history	Time between onset of symptoms to arrival in hospital (hours)				Average hospital stay (days)
			<24	24-48	48-72	>72	
< 10	153	89	124	29	-	-	3.7
10-20	141	43	105	32	4	-	2.8
20-30	102	13	89	12	1	-	2.4
30-40	72	5	61	11	-	-	2.6
40-50	67	4	52	12	1	2	3.1
50-60	27	2	22	1	3	1	2.8
>60	12	1	8	2	2	-	3.3
Total	574	157(27.4%)	461(80.3%)	99(17.2%)	11(2%)	3(0.5%)	3.0

Figure 2

Table 2: Profile of patients with perforated appendicitis

Age group (yrs)	Number	Positive family history of appendicitis	Past history of appendicitis	Time between onset of symptoms to arrival in hospital (hours)				Average hospital stay (days)
				<24	24-48	48-72	>72	
< 10	31	05	-	-	-	8	23	7.3
10-20	16	02	1	-	-	1	15	7.7
20-30	08	01	1	-	-	-	8	6.8
30-40	-	-	-	-	-	-	-	-
40-50	04	01	-	-	-	-	4	8
50-60	07	-	-	-	-	-	7	7.2
>60	06	-	1	-	-	1	5	11.2
Total	72	09(12.5%)	3(4%)			14%	86%	7.7

Figure 3

Table 3: Demographic data of patients

Category of patients	Economic status (average monthly income in Indian Rupees)			Educational background (qualifications)				Distance of residence to hospital	
	<1000	1000-5000	>5000	Illiterate	primary	secondary	higher	<40km	>40km
Appendicitis without perforation	148 (26%)	241 (42%)	165 (32%)	80 (14%)	144 (25%)	216 (36%)	132 (23%)	528 (92%)	46 (8%)
Perforated appendicitis	23 (32%)	28 (39%)	21 (29%)	14 (19%)	19 (26%)	24 (33%)	15 (21%)	14 (19%)	58 (81%)

All the patients of perforated appendicitis were operated upon under general anesthesia .After exploration 52 cases (70%) had localized peritonitis/abscess formation whereas 22 (30%) had generalized peritonitis as shown in figure 1. Among these cases, 66 (89%) had been diagnosed preoperatively and in 8 cases (11%) diagnosis was reached only after laparotomy.

Figure 4

Table 4: Management of patients

Category of patients	Management				
	Appendectomy	Conservative	Laparotomy, peritoneal lavage and appendectomy	Laparotomy, peritoneal lavage/drainage of appendicular abscess without appendectomy	Open/CT- or USG-guided drainage of residual abscess
Appendicitis without perforation	551 (96%)	23 (4%)	-	-	-
Perforated appendicitis	-	-	38 (53%)	34 (47%)	4 (7%)

Figure 5

Table 5: Complications encountered in the patients

Category of patients	Wound infection	Respiratory complications	Sepsis requiring intensive care	Urinary complications	Residual abscess	Death
Appendicitis without perforation	17 (3%)	-	-	6 (1%)	-	-
Perforated appendicitis	32 (44%)	6 (8%)	5 (7%)	5 (7%)	4 (8%)	3 (4%)

Figure 6

Table 6: Reasons of delay in reporting to hospital in cases of perforated appendicitis

Reason of delay	Within 40km of hospital	Outside 40km of hospital
Not seeking medical care due to preoccupation with work	1 (7%)	18 (31%)
Inability to seek medical care	3 (21%)	7 (12%)
Failure of early diagnosis by qualified medical practitioners	2 (14%)	5 (9%)
Inappropriate treatment by unqualified practitioners	8 (56%)	28 (48%)

## DISCUSSION

Appendicitis is the commonest surgical emergency in most of the countries, particularly in the affluent ones, though even in economically backward regions its incidence is also on rise.<sup>1,2</sup> In the literature, Amyand is credited with performing the first appendectomy when he incidentally discovered a perforated appendix in an inguinal hernia sac of a boy with enterocutaneous fistula.<sup>3</sup> It was only after nearly 150 years, when Lawson Tait in London presented the first successful transabdominal appendectomy for gangrenous appendix in 1880 <sup>4</sup> and it was in 1886, when Reginald Fitz of Harvard Medical School first described the natural history of the inflamed appendix, coining the term “appendicitis”.<sup>5</sup> Since then, in the past 125 years, numerous advances in the diagnosis and treatment of appendicitis have emerged. Nonetheless, acute appendicitis continues to challenge surgeons to this day and this condition<sup>6</sup> is still causing morbidity and mortality, particularly in economically deprived people.<sup>7</sup>

On analysis of our data depicted in Table 1 and 2, it is evident that in the non-perforated appendix group, there is strong family history of appendectomy (27.4 %) as compared to the perforated group (12 %).This difference is particularly marked in the patients up to 20 years of age with 39% of non-perforated appendicitis cases having positive family history as compared to 12.5% in the perforated group. This statistically significant difference (p<0.01) in the familial link of the two disease entities may be attributed to two reasons: 1) non-perforated and perforated appendicitis are two different diseases as suggested by some studies <sup>8,9</sup>

and 2) the experience of having a patient of appendicitis leads to education of the family and in case of a subsequent similar episode in the family, health care facilities are approached earlier preventing complications including perforation. If the second reason is valid, health education of the general population through various available means can have a definite impact in decreasing the incidence of perforated appendicitis.

From Table 1 and 2, it is evident that about 88% of the patients in the non-perforated appendicitis group reported to the hospital in less than 48 hours of the onset of the symptoms whereas only 14% of the cases of perforated appendicitis reported within 48 hours. This delay in seeking expert medical care has been reported to be a major factor in leading to perforation of appendix in literature.<sup>11</sup> Various studies have been conducted to study the causes of delay in seeking expert medical care and various causes like lack of education, racial discrimination, poverty, improper diagnosis by primary healthcare/emergency physicians and non-availability of healthcare facilities have been found out.<sup>12</sup> From the demographic data of our patients as depicted in Table 3, we found no statistically significant difference in economic status, gender or level of formal education between the perforating and the non-perforating appendicitis groups ( $p>0.01$ ) concluding thereby that formal education and better economic status does not reflect better health awareness in our population. However, 81% of cases with perforation belonged to suburban and rural areas (more than 40km from hospital) and 19% of cases were residing within 40 km of the hospital and this difference is statistically significant. Considering the fact that there is a lack of proper roads and transportation facilities in most of the suburban and rural areas, it takes hours to cover even what might be considered as short distances in other developed regions of the world. In the rural areas, people are preoccupied with agriculture-based work or work as daily wagers, particularly during harvest seasons and 31% of patients or their caregivers had simply ignored the early symptoms to avoid disturbance of their work by seeking expert medical care away from their homes as compared to only 7% of city dwellers in whom health facilities are available at short distances. However, one significant factor which was found to be the cause of delay in seeking expert medical care in both rural and urban population was seeking of medical care from unqualified and illegally operating quacks that sell over the counter and controlled medicines. This factor alone contributed to delay in proper care of about half of the cases. Such illegally operating medical shops have particularly

mushroomed throughout this subhimalayan valley in the last two decades due to ongoing militant struggle and political instability and resultant weakening of the primary healthcare system. We could not find such a contributory factor in literature and by controlling this preventable factor alone, the incidence of complicated appendicitis can be expected to fall significantly thereby resulting in prevention of morbidity, mortality and economic losses.

Perforated appendicitis results in increased morbidity and increased hospital stay in literature.<sup>11-13</sup> In our study, the mean hospital stay was 7.7 days in perforated appendicitis as compared to 3.0 days in the non-perforated group.

Misdiagnosis by qualified medical practitioners was found in a very low percentage though this forms a major factor in many published series.<sup>13,14</sup> This difference can be attributed to the fact that in our series, most of the patients either did not report to the medical practitioners in early stages of disease or were seen by quacks and sought expert medical care only when complicated. In other regions, where primary healthcare systems are well established, the missed and delayed diagnosis is a major factor in complicating appendicitis, increasing morbidity and mortality.<sup>14,15</sup>

As far as the management of the cases is concerned, 96% of cases with non-perforated appendicitis underwent appendectomy and 4% were managed conservatively as they had formed a lump. In the perforated appendicitis group, all the patients required surgery, appendectomy was done in only 52% of cases and in the rest appendectomy was not done. In the postoperative period, complications were observed in 73% of cases of perforated appendicitis and death occurred in 4% patients. In comparison, complications were seen in only 4% of non-perforated appendicitis cases and there was no mortality. Similar trends are seen in other studies in literature.<sup>16-18</sup>

## **CONCLUSION**

Perforated appendicitis has a significant associated morbidity and mortality as compared to the non-perforated one. Measures to avoid the delay in reporting of patients at expert health care facilities should result in decreasing the incidence of these preventable complications. In our case, this would include the strict enforcement of ban on malpractice by quacks, health education of general masses and provision of primary healthcare facilities within the reach of people.

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**Author Information**

**Sajad Salati, MBBS, MS, MRCS (Glasgow)**

Senior Resident, Sheri Kashmir Institute of Medical Sciences

**Ajaz Rather, MBBS, MS**

Consultant, Sheri Kashmir Institute of Medical Sciences

**Shabeer Wani, MBBS, MS, MCh**

Senior Resident, Sheri Kashmir Institute of Medical Sciences