PATHOLOGIC FINDINGS IN ACUTE APPENDICITIS : A PROSPECTIVE STUDY OF 73 VARIABLES

M.R. Zafarghandi and K.M. Ardalan

Faculty of Medicine, Tehran University of Medical Sciences, Tehran, Iran

Abstract - This study has been carried out on 70 patients who were admitted to Sina Hospital emergency department with a clinical diagnosis of acute abdominal pain and underewent appendectomy.

70 pathologic specimens (appendices) were studied macroscopically and microscopically; 46 cases were consequently diagnosed as appendicitis and 24 as non-appendicitis. All 70 specimens were examined carefully for the existence or measurement of the 73 variables.

Acta Medica Iranica 37 (4): 237-241 ; 1999

Key Words: Abdominal pain, appendicitos

INTRODUCTION

Acute appendicitis is one of the most common causes of surgical emergencies (1). The causative factors of appendicitis might vary depending on race and living conditions (e.g. lifestyle, diet, climate and economic conditions and ...) in different parts of the world. This may cause some differences in clinical and paraclinical manifestations of acute appendicitis in our country.

The aim of this study was to demonstrate the pattern of occurence of different pathologic findings in Iranian patients and to elucidate the most frequent and statistically related ones.

MATERIALS AND METHODS

This is a cross-sectional descriptive study which is part of a more extensive research on patients who were suffering from acute abdominal pain and were admitted to the Sina Hospital emergency department. 143 cases were diagnosed as appendicitis by pathology department. This study is focused on 70 consecutive cases who underwent appendectomy. (Because our data gathering began after the initiation of the main study, patients who underwent appendectomy before our study were not included). In the end, 46 cases were diagnosed as appendicitis by the pathology department (65.71%) and 24 as non-appendicitis (34.29%).

Statistical analysis was performed by SPSS under windows (Ver. 7). The analysis of meaningful relationship is performed by Pearsons' and Fisher's exact tests and two-side significance level has been mentioned in each case.

RESULTS

A: Quantitative variables

1- The length of the samples was measured in all cases. The maximum (max) length was 140 mm and the minimum (min). was 10 with a mean of 76.54 ± 2.78 mm and a standard deviation of 22.63. (Table 2, No. 1).

Table 1. Frequency of pathologic diagnosis

Pathologic diagnosis	Appendicitis	non appendicitis	Total
No of cases	46	24	70
Percent	65.71	34.29%	100%

2- The maximal diameter (mm): This is the maximum diameter (the external diameter) measured in millimeters (mm). It measured in 70 cases. The max was 30 mm and the min was 5 mm with a mean of 11.40 ± 0.58 mm and a standard deviation of 4.83 mm (Table 2, No. 2).

3- The thickness of the appendiceal wall was in millimeters measured in 40 cases. The max was 8 mm and the min was 1 mm, with a mean of 3.40 ± 0.31 and standard deviation of 1.95 mm (Table 2, No. 3).

Table 2. Descriptive analysis of the 3 quantitative variables

Variable Name	No. of Valid cases	No. of missing cases	Mean (95% confidence)	Median	Mode	Std. deviation	Variance	Range	Max	Min
1. Length of samples	70	0	76.54±2.70	80.00	80	22.63	511.99	130	140	10
2. Maximal diameter	70	0	11.40±0.58	10.00	10	4.83	23.37	25	30	5
3. Thickness of duct	40	30	3.40±0.31	3.00	2	1.95	3.75	7	8	1

B: Qualitative variables

B1. Gross appearance

(In some variables the number of valid cases is less than 46. This is because, these variables were added to our study after the initiation of the study.

1- Kind of appendicitis: specifies whether it was obstructive or non obstructive (2). In 29 cases (69.0%) it was obstructive and in 5 non-obstructive (11.9%) it was non obstructive (Table 3, No. 1).

2- Patency of duct relates to whether the orifice of the duct was open or not (3). It was patent in 43 cases (93.5%) and not patent in 3 (6.5%) (Table 3, No. 3).

3- Patches of hyperemia (serosal) were defined : existence of hyperemic regions on the serosal surface (3) was positive in 37 cases (86.0%) and negative in 6 (14.0%) (Table 3, No. 32).

4- Gross perforation of the appendix was present in 5 cases (23.8) and absent in 16 (76.2%) (Table 3, No. 5).

5- Fragmentation of the appendix by necrotic regions was present in 4 cases (9.8%) and absent in 37 cases (90.2%).

6- Surface exudate: (serofibrinous or fibrinopurulant) was observed in 18 cases (85.7%) (Table 3, No. 3).

7- Phelegmon (suppuration of the wall of the appendix without pus collection) was positive in 1 (5.3%) case.

8- Mucocele (accumulation of mucus in the appendix) was seen in all the cases that were studied for this variable.

B2- Other findings

1- Intramural abscess (accumulation of pus between layers of appendiceal wall) was present in 2 cases (5.4%) and negative in 35 (94.6%).

2- Neoplasia (primary or secondary) was absent in all of the 46 cases.

3- In 1 case (2.2%), granulation bud was present in the appendiceal wall.

4- Granuloma: Granulomas were not present in any of the 46 cases.

5- Lymphoid hyperplasia was positive in 17 cases (37.8%) and negative in 28 (62.2%) (Table 3, No. 19).

6- Filaments of Actinomycosis were absent in all of the cases.

7- Warthin-Finkeldey giant cell was present in only 1 case (3.0%) out of 33 cases.

8- The most frequent cause of obstruction was fecalith (76.3%) (Table 3, No. 2).

Table 3- Frequencies of pathologic findings

Variable		Values	Frequency	Valid percent	No. of missing	No. of valid
1. Kind of appendicitis		Obstructive	29	69.0	4	42
		Non obstructive	5	11.9		
		Uldetermined	8	19.0		
2. Cause of obstruction		Fecalith	29	76.3	9	37
		Constriction	1	2.6		
		Tumor	1	2.6		
		Lymphoid hyperplasia	1	2.6		
		Undetermined	6	15.8		
3. Patency of duct		Patent	43	93.5	0	46
		Not patent	3	6.5		
4. Lumen filled with		Fecalith	31	67.4	5	41
		Fecalith & necrotic residues	8	17.4		
		Tumor	1	2.2		
		Parasites	1	2.2		
5. Perforation		Perforated	5	23.8	25	21
		Not perforated	16	76.2		
6. Phlegmon		Positive	1	5.3	27	19
		Negative	18	94.7		
7. Congestion in	Submucosal layer	Positive	29	64.4	1	45
		Negative	16	35.6		
8. Congestion in	Subserosal layer	Positive	41	89.1	0	46
		Negative	5	10.9		
9. Congestion in	Serosal layer	Positive	43	95.6	1	45
		Negative	2	4.4		
10. Edema in	Mucosal layer	Positive	36	81.8	2	44
		Negative	8	18.2		
11. Edema in	Submucosal layer	Positive	37	82.2	1	45
		Negative	8	17.8		
	Subserosal	Positive	41	91.1		

Table 3. continued

12. Edema in	layer	Negative	4	8.9	1	45
	Serosal	Positive	2	4.7		
13. Fibrosis in serosal	layer	Negative	41	95.3	3	43
		Positive	18	72.0		
14. Fibrinopurulent exudate		Negative	7	28.0	21	25
	Serosal	Positive	16	39.0		
15. Hemorrhage in	layer	Negative	25	61.0	5	41
		Positive	9	21.4		
16. Mucosal infarct		Negative	33	78.6	4	42
17. Vascular	submucosal	Positive	7	17.1		
thrombosis in the	layer	Negative	3.4	82.9	5	41
18. Vascular	Serosal	Positive	11	26.2		
thrombosis	layer	Negative	31	73.8	4	42
19. Lymphoid hyperplasia		Positive	17	37.8		
		Negative	28	62.2	1	45
20. Lymphocytic & plasma cell		Positive	32	71.1		
mucosal infiltration		Negative	13	28.9	1	45
21. Lymphocytic & plasma cell		Positive	31	68.9		
submucosal infiltration		Negative	14	31.1	1	45
22. Lymhocytic & plasma cell		Positive	17	38.6		
muscular infiltration		Negative	27	61.4	2	44
23. Lymphocytic & plasma cell		Positive	18	40.9		
subserosal infiltration		Negative	26	59.1	2	44
24. Lymphocytic & plasma cell		Positive	19	43.2		
serosal infiltration		Negative	25	56.8	2	44
25. PMN mucosal		Positive	42	91.3		
infiltration		Negative	4	8.7	0	46
26. PMN submucosal	Positive	42	91.3			
infiltration		Negative	4	8.7	0	46
27. PMN Muscular		Positive	42	91.3		
infiltration		Negative	4	8.7	0	46
28. PMN	subserosal	Positive	40	87.0		
	infiltration	Negative	6	13.0	0	46
29. PMN	Serosal	Positive	40	87.0		
	infiltration	Negative	6	13.0	0	46
		Positive	18	85.7		
30. Surface exudate		Negative	3	14.3	25	21
31. Serofibrinous	Positive	17	68.0			
exudate	Negative	6	24.0	21	25	
32. Patches of	Positive	37	86.0			
Serosal hyperemia	Negative	6	14.0	3	43	
		Positive	14	33.3		
33. Mucosal suppurative necrosis		Negative	28	66.7	4	42
34. Serosal		Positive	2	4.8		
suppurative necrosis		Negative	40	95.2	4	42
35. Swelling in		Positive	19	79.2		
pathologic view		Negative	5	20.8	22	24
36. Ulcer	Mucosal	Positive	11	25.6		
		Negative	32	74.4	3	43
37. Ulcer	Serosal	Positive	1	2.3		
		Negative	42	97.7	3	43
38. Gangrenous	Mucosal	Positive	4	9.8		
necrosis		Negative	37	90.2	5	41
39. Gangrenous	Serosal	Positive	0	0		
necrosis		Negative	40	100	4	42

Table 4- Crosstables & Chi squares

Variable Name		Pathologic diagnosis Not appendicitis	Appendicitis	Total	Value of Pearson's χ^2	No. of missing cases	Significance (2-sided)
1. Patches of hyperemia	+	11	37	48			
	-	12	6	18	11.036	4	0.001
	Total		23	43	66		
2.	+	4	19	23			
Swelling in pathologic view	-	12	5	17	11.526	30	0.001
	Total		16	24	40		
3. Fibrinopurulent exudate	+	0	18	18			
	-	16	7	23	20.536	29	0.000
	Total	16	25	41			
4. Submucosal edema	+	10	37	47			
		-	11	8	19	8.363	40.004
	Total	21	45	66			
5. Mucosal edema	+	11	36	47			
	-	11	8	19	7.243	4	0.007
	Total	22	44	66			
6. Lymphocyte &	+	8	32	40			
plasma cell mucosal infiltration	-	16	13	29	9.168	1	0.002
	Total	24	45	69			
7. Lymphocyte & plasma cell	+	6	31	37			
submucosal infiltration	-	18	14	32	12.124	1	0.000
	Total	24	45	69			
8. Lymphocyte &	+	1	17	18			
plasma cell muscular infiltration	-	23	27	50	9.480	2	0.002
	Total	24	44	68			
9. Lymphocyte & plasma cell	+	1	18	19			
subserosal infiltration	-	23	26	49	10.413	2	0.001
	Total	24	44	68			
10. Lymphocyte & plasma cell	+	2	19	21			
serosal infiltration	-	22	25	47	8.835	2	0.003
	Total	24	44	68			
11. PMN mucosal	+	4	42	46			
infiltration	-	20	4	24	38.995	0	0.000
	Total	24	46	70			
12. PMN submucosal	+	4	42	46			
infiltration	-	20	4	24	38.995	0	0.000
	Total	24	46	70			
13. PMN muscular	+	3	42	45			
infiltration	-	21	4	25	42.659	0	0.000
	Total	24	46	70			
14. PMN subserosal	+	3	40	43			
infiltration	-	21	6	27	36.901	0	0.000
	Total	24	46	70			
15.PMN serosal	+	3	40	43			
infiltration	-	21	6	27	36.901	0	0.000
	Total	24	46	70			
16. Cognestion in	+	7	29	36			
submucosa	-	17	16	33	7.807	1	0.005
	Total	24	45	69			
17. Surface (*)	+	0	18	18			
exudate	-	8	3	11		41	0.000
	Total	8	21	29			

Table 4. continued

18. Subserosal(*) exudate	+	12	41	53		
	-	9	4	13	4	0.002
	Total	21	45	66		
19. Congestion in subserosa (*)	+	15	41	56		
	-	9	5	14		
	Total	24	46	70		
20. Congestion in serosa (*)	+	16	43	59		
	-	8	2	10	1	0.002
	Total	24	45	69		
21. Maximal diameter(*)	< 10mm	16	8	24		
	≥ 10mm	8	38	46	0	0.000
	Total	24	46	70		

DISCUSSION

1- The most frequent kind of appendicitis was obstructive and the most frequent cause of obstruction was fecolith.

2- Congestion in serosal layer was the most frequent microscopic finding, We found a meaningful relation between it and the diagnosis of appendicits ($P<0.01$) (Table 4, No. 16, 19, 20).

3- PMN infiltration observed chiefly in the interior layers (mucosal, submucosal and muscular), was the second most common finding. We found a meaningul relation with pathologic diagnosis of appendicitis ($P<0.01$) (Table 4, No. 11-15).

4- Lymphocytic and plasma cell infiltration, chiefly in inner layers (mucosal and submucosal), was frequent and related to appendicitis in these two layers ($P<0.01$) (Table 4, No. 6-10).

5- Edema was most frequent in the subserosal layer, and significantly related to appendicits ($P<0.01$) (Table 4, No. 4,5,18).

6- Surface exudate and fibrinopurulent exudate were frequent and related to appendicitis ($P<0.01$) (Table 4, No. 17,3).

7- Patches of hyperemia are frequent findings in gross inspection of serosal layer and are related to appendicitis ($P<0.01$) (Table 4, No.1)

8- Swelling in pathologic view is frequent and related to appendicitis ($P<0.01$) (Table 4, No. 2).

9- Maximal diameters more than or equal to 10 mm are positively related to appendicitis, due to the swelling of appendicitis specimens (Table 4, No. 21).

10- Infiltration occurs more frequently in the internal layers of appendiceal wall.

11- Fibrosis occurs more frequently in the external layers of the appendix. (serosal and subserosal).

12- Edema and congestion accumulate predominantly in external layers of the wall. (Serosal and subserosal) (Results, B3, No. 1,2,3,35).

13- Hemorrhage and vascular thrombosis occur more frequently in the external layers of the wall. (Serosal and subserosal).

REFERENCES

1. Seal A. Appendicitis: A historical review. Can. J. Surg. 24: 427-433; 1981.

2. Principles of surgery: Schwartz: Appendix 1994: 1307-1318

3. Robbins: Pathologic basis of disease: Cotran, Kumar, Robbins 1989, 902-904.

INTRATHECAL NEOSTIGMINE AND DURATION OF POSTOPERATIVE ANALGESIA FOR PERINEAL SURGERY

B. Jahangiri

Department of Anaesthesiology, Imam Khomeini Hospital, Faculty of Medicine, Tehran University of Medical Sciences, Tehran, Iran

Abstract - The effects of intrathecally administered neostigmine methylsulphate have been tested in animals, and volunteers. In all patients addition of neostigmine methylsulphate to spinal anaesthesia with lidocaine 5%, prolongs the analgesia period. In 20 patients undergoing perineal surgery, a 50 μg dose of neostigmine was injected in the subarachnoid space with 22 gauge spinal needle, at L4-L5 interspace in the sitting position.

The patients were hemodynamically stable. The subrachnoid injection of neostigmine provided significantly longer postoperative analgesia (4 hours).

Acta Medica Iranica 37 (4): 242-243 ; 1999

Key Words: Postoperative analgesia, intrathecal neostigmine, lidocaine.

INTRODUCTION

Neostigmine methylsylphate (prostigmine) is a white crystalline powder, odourless and soluble in water. Neostigmine methylsulphate 1: 2000, 1 ml ampule contains 5 mg Neostigmine Methylsulphate compound with 0.2% Methylparaben as a preservative. Its pH is adjusted to approximately 5.9 with sodium hydroxide. It has a molecular weight of 334.4 and a density of 0.0015. Most of the drug is excreted by glomerular filtration in the kidney, and a similar proportion is destroyed by the liver. The plasma half-life of the drug is between 30-50 minutes.

Intrathecal neostigmine, previously shown to possess antinociceptive properties, prevents spinal block hypotension without neurotoxic effects in rat and dog (1).

The aim of this study is to evaluate the side effects and analgesia duration of spinal neostigmine along with lidocaine 5% in perineal operations on human beings.

MATERIALS AND METHODS

The research was carried out in 20 patients divided into two groups of 10 persons each, all patients were ASA 1. The average age was 32.2 (23-40) years. Spinal block was performed with 22 gauge spinal needle at L4-L5 interspace, in the sitting position.

Group I : Spinal anaesthesia with 2 ml lidocaine 5% plus 50 μg neostigmine methylsulphate in 1 ml normal saline with a 22 gauge spinal needle.

Group II : Control, spinal anaesthesia with 2 ml lidocaine 5% plus 1 ml normal saline with a 22 gauge spinal needle. All patients underwent perineal operation. Analgesia, nausea and vomiting were checked within 24 hours after injection.

Blood pressure (BP) and pulse rate were montiored by noninvasive devices.

The efficacy of the 50 μg neostigmine group and control group was assessed using pin-prick Visual Analogue Pain Score (VAPS) at 60-120-150-210-240 minutes after injection of the test solution.

The VAPS target of the study period was extended to a maximum of 240 minutes.

RESULTS

Enrolled in this study were 11 cases of hemorrhoid, 8 cases of anal fistula and one case of sphincteroplasty. The mean BP was 118.71 mmHg. BP did not show any fluctutions or spikes following the spinal analgesia. Nausea and vomiting were not found in any of the cases. In group I, analgesia lasted for 245 minutes and in group II (control), it lasted for 60 minues.

DISCUSSION

In all patients the addition of neostigmine methylsulphate to spinal anaesthesia with lidocaine 5%, prolonged the analgesic period. Intrathecal neostigmine proved effective in relieving postoperative pain in all the 10 patients.

The age range was from 23-40 years (mean age 32.2 years). Patients were ASA class I and scheduled

for perineal surgery. The intrathecal injection of neostigmine provided longer postoperative analgesia (4 hours) and these patients did not require analgesics during the entire postoperative period.

REFERENCES

1. Minovsky Ch, Popova S., Milinich A. and Apostolov I. Neostigmine Methylsulphate as an additive in spinal and extradural anaesthesia: Comparative evaluation of analgesia duration and some side effects, Br. J. Anaesth. 79: 72; 1996.

2. Altintas F., Bozkurt P. Utku, T., Tunali Y. and Kaya G. Significant swelling due to intrathecal Neostigmine when used in adjunct to bupivacaine Br. J. Anesth. 79: 73; 1996.

3. Eisenach JC. and Hood. D. Interaction between spinal neostigmine and extradural clonidine in human. Br. J. Anaesth. Suppl. 13; 1995.

4. De Rosa, R.C. Robertis, Ughi, E.E L. Lanza A. and Palomba R. Is the use of intrathecal neostigmine for postoperative analgesia worth while Br. J. Anaesthe 79: 73; 1996.

5. D. Miller. Anesthesia Churchill livingstone Inc. 1994; 4th ed. 567.

6. Collins J. Principles of anesthesiology. Third Edition, Vol 2, Lea & Febiger. 1993: 1034-1037.

7. Wylie and churchill - Davidson's. A practice of Anaesthesia, 4th Ed. Vol I. LLOYD - Luke (Medical Books) LTD. 1984: 731-733.