PATHOLOGY OF THE APPENDIX

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An audit of 3374 appendectomy specimens in 2578 Saudi and 796 non-Saudi nationals revealed a diagnosis rate of 74.7% of inflamed appendix, a normal appendix range of 7.8% to 22.5% with the higher rate of normal appendix found among females. The finding of high incidence of schistosomal appendicitis among Egyptian males is not surprising given the high incidence of schistosomiasis among Egyptians in general. The alternate diagnoses, which include such conditions as neoplasm, mucocele, other inflammatory conditions such as periappendicitis, and parasitic infestations, are not different from findings in the reported literature. (*J Natl Med Assoc.* 2000;92:533–535.)

Key words: pathology ♦ appendectomy ♦ alternate diagnoses

Emergency appendectomy is the commonest intra-abdominal operation performed in most of the world, including the Asir region of Saudi Arabia.[1–5] Acute appendicitis is the commonest pathological diagnosis in these specimens, but a variety of alternate diagnoses is also encountered. Saudi Arabia work force includes many nationals besides Saudis and these nationals do receive both emergency and elective medical/surgical treatment in Saudi hospitals. A review of 3374 appendices removed at both emergency and elective operations at Asir Central Hospital (ACH), Abha and neighboring hospitals in the Asir region of Saudi Arabia constitutes the content of this communication. The purpose of the study is to determine the pattern of pathological diagnoses made from these specimens.

METHODS

Analysis of 3374 appendices removed from 2578 Saudi and 796 other nationals registered at the Department of Pathology, Asir Central Hospital, Abha, Saudi Arabia from 1987–1993 was made to review the demographics of the patients and the different pathological diagnoses. ACH receives pathological specimens from both within and without Abha where facilities for pathological diagnosis of these specimens are not available.

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RESULTS

Of the 3374 specimens, 2578 were from Saudi patients (1478 males and 1100 females) The other 796 specimens came from other nationalities (Table 1).

The commonest diagnosis was inflamed appendix: 2522 or 74.7%. Alternative diagnoses entered into the study are listed in Table 2, the most common of which are normal appendices (n = 387); early acute appendicitis (n = 127); periappendicitis (n = 117); fibrosis (n = 80); perforation (n = 51); schistosomiasis (n = 45); fecalith (n = 43); gangrene (n = 41); and enterobius vermicularis (n = 30). At the lower end of alternate diagnoses are carcinoid of the appendix (n = 3); abscess, ulceration, serosal foreign body and mucocele (2 each); and focal eosinophilic infiltrate and trichuris infestation. Some of the above-mentioned alternative diagnoses were listed with the specific diagnosis "inflamed appendix," thus making an overlap with the 2522 specimens under inflamed appendix.

The distribution of the pathology as seen in Saudi and non-Saudi nationals (males and females) in eight major alternative diagnoses is as shown in Table 3.

Table 1. Nationalities of Patients

Nationality	Male	Percent of total	Female	Percent of total	Total	Percent of Total
Saudi	1478	43.8	1100	32.6	2578	76.4
Yemenis	161	4.8	50	1.5	211	6.3
Egyptians	147	4.3	47	1.4	194	5.7
Filipinos	49	1.5	21	0.6	70	2.1
Pakistanis	58	1.7	6	0.2	64	1.9
Indians	52	1.6	11	0.3	63	1.9
Others	138	4.1	56	1.6	114	5.7
Total	2083	61.8	1291	38.2	3374	100.0

DISCUSSION

Since 1986 when Fitz[6] deduced the sequence leading from acute inflammation of the vermiform appendix to peritonitis and iliac-fossa abscess and recommended surgical treatment for most cases, volumes have been written on diseases of the appendix. To know the pathology expected in a group of patients will help in predicting diagnoses and anticipating proper treatment, but the vermiform appendix can field a variety of alternate diagnoses besides acute inflammation. The rate of inflamed appendix in the series of 3374 appendices is 74.7%. On account of the alternate diagnoses entered in the series the normal appendices ranged between 7.8% in Saudi males to 22.5% in non-Saudi females with non-Saudi males (8.4%) and Saudi females (16.1%) coming in between. This pattern is similar to reported series in the literature.[1–5,7] Higher rate of normal appendices in females than in males is due to the encounter of differential diagnoses like ovarian cysts and other gynecological conditions that mimick appendicitis in females. The reason for a higher incidence of normal appendices in the non Saudi female is unknown. The reason may be found in the next stage of this study - differential diagnoses of acute appendicitis in this group.

The only remarkable difference between Saudis and non-Saudis in the alternate diagnoses in this group is the occurrence of schistosomal appendicitis in Egyptian males (15.6%) as against less than 1% in others. Schistosomiasis is known to be endemic in Egypt. The 18 Saudis (14 males and 4 females) and the 4 Yemeni males with the same condition are the only other patients with this infestation. Have they visited Egypt? This is not known. Schistosomiasis has been known to be associated with rupture of the appendix in pregnancy.[8] A combination of the alternate diagnosis can be seen in schistosomal appendicitis with granulomatous inflammation, fibrosis and eosinophilic infiltration and serositis with peritoneal adhesions.[9]

Table 2. Distribution of Alternate Diagnoses

Histology	Incidence
Lymphoid Hyperplasia	6
Neoplasm	
Carcinoid	3
Cystadenoma	1
Inflammation	
Early acute appendicitis	127
Periappendicitis	117
Perforation	51
Gangrene	41
Chronic appendicitis	8
Peritonitis	8
Granulomatous appendicitis	3
Abscess	2
Ulceration	2
Serosal foreign body	2
Frank acute appendicitis	1
Focal eosinophilic infiltrate	1
Infestation	
Schistosomiasis	45
Enterobius vermicularis	30
Trichuriasis	1
Fibrosis	
Partial obliterative	41
Obliterative	39
Miscellaneous	
Fecalith	43
Mucocele	2
Plus others such as local hemorrhage, necrosis, luminal appendicitis, serositis, eosinophilic infiltration and mild inflammation	

Note: Some of the alternate diagnoses are found in some of the 2522 inflamed appendixes.

Table 3. Distribution of Alternate Diagnoses in Saudis and Non-Saudis

	Saudis				Non-Saudis			
	Male = 1478		Female = 1100		Male = 606		Female = 191	
ALTERNATE DIAGNOSES	No.	Percentage	No.	Percentage	No.	Percentage	No.	Percentage
Normal	116	7.8	177	16.1	51	8.4	43	22.5
Early Acute Appendicitis	51	3.4	49	4.5	11	1.8	16	8.4
Periappendicitis	60	4.0	27	2.5	19	3.1	11	5.8
Fibrosis	22	1.5	35	2.9	15	2.5	8	4.2
Perforation	22	1.5	18	1.6	10	1.7	1	0.5
Schistosomiasis	14	0.9	4	0.4	26	4.3	1	0.5
Egyptians only					23/147	15.6		
Enterobius vermicularis	9	0.6	14	1.3	6	0.9	1	0.5
Fecalith	22	1.5	14	1.3	5	0.9	2	1.1
Gangrene	20	1.3	14	1.3	4	0.7	3	1.5

Our rate of perforations (0.5% to 1.7%) is rather low compared to a larger series reported by Primatesta and Goldacre (6.3% or 2994 out of 47,505 patients) wrongly reported as 9.3%.[10] Appendiceal fecaliths and calculi appear to play a role in the pathogenesis of acute appendicitis and are associated with complicated appendicitis (perforation and abscess).[11]

Periappendicitis has been regarded a pathologic curiosity with little clinical significance but Fink et al.[12] have definitely proved that the identification of periappendicitis in the patient presumed to have acute appendicitis is of definite clinical significance and may merit further clinical investigation such as signs of intra-abdominal pathology that might have spread to the surroundings of the large bowel and appendix.

At the lower end of the alternate diagnoses, mucocele incidence of 2/3374 or 0.06% seems to come within the range of 0.07% to 0.3% reported by Kahn and Friedman.[13] Cystadenoma and carcinoid tumors are the only neoplastic conditions found in these 3374 appendiceal specimens. Carcinoid was the most common neoplasm of the appendix also in reported literature.[3]

CONCLUSION

Of the 3374 appendiceal specimens reviewed, acute appendicitis was found in 74.7%; normal appendix ranged between 7.8% and 22.5% in different groups and sexes with the female accounting for the higher rate. Alternate diagnosis made compare well with that of reported literature. A clinicopathologic correlation of these alternative diagnoses will constitute another study.

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