Rheumatic Fever and Carditis at National Institute of Cardiovascular Disease; A Follow up Study

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SUMMARY

Data on 249 children with rheumatic heart disease visiting the NICVD during the period 1980 - 1985 is presented. Acute rheumatic fever was diagnosed in 95 patients. In 136 patients there was evidence of carditis but no valvulitis ESR and ASOT within normal limits. In 20 patients there was evidence of valvulitis with normal ESR and ASOT. Recurrent acute rheumatic fever was noted in 5.3% and bacterial endocarditis in 4.8%. Of these 249 patients 17 died giving a total known mortality of 6.8%. In our study, the prognosis of a child with rheumatic carditis remains guarded for many reasons.

Rheumatic fever and Rheumatic heart disease is most prevalent in poor communities in Pakistan. It is the commonest form of heart disease in Pakistani children. Studies by Ilyas showed an incidence of 11 per one thousand population in the rural communities of Sarhad, North west frontier province (1). Rheumatic heart disease was the predominant cause of admission for heart disease in a general children's Hospital (2 - 3) and the incidence of patients with Rheumatic heart disease, attending the Pediatric cardiac referal clinic at the National Institute of Cardiovascular Diseases (NICVD) Karachi was 9.6% (4).

It is true to say that comprehensive programmes of primary or secondary preventionof Rheumatic fever do not exist in Pakistan. There is also no general consensus amoung pediatricians and cardiologists as to the seriousness and magnitude of the problem. We are becomming more and more aware of the presence of coronary artery disease because the middle class professional is a sufferer from coronary artery disease and poor destitute, living in Kachi Abbadies of our sprawling urban population is the sufferer from Rheumatic fever. Nation wide, Rheumatic fever and Rheumatic carditis is probably the most important form of serious heart ailment which affects our children as well as adults and is a major cause of disability in the young. It is also a disease which can be effectively prevented.

We present our cumulative experience with Rheumatic fever and Rheumatic heart disease in children who were seen and followed at the NICVD during 1980 to October 1985 period.

Material and Methods:—

Two hundred and forty nine children visiting the pediatric cardiology clinic during

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1980 to Oct 1985 period were included in the study. The follow up visits were arranged, according to the severity of heart disease, at 3 monthly or shorter intervals. The records of hospital admission, special investigations such as Echocardiography and cardiac Catheterization, were available for evaluation of severity of carditis. History of preceeding sore throat and other manifestations of acute Rheumatic fever were inquired into during clinical assesment; Electrocardiogram and chest x-ray examination were a part of assesment for all patients.

The Information about death at the NICVD was available. Eighty one patients were seen only once and were assumed lost to follow up and 168 patients were followed till 1985. The final assesment was made from the examination record of the day when patient was last examined prior to October 1985. Therefore the follow up of each patient does not conclude till October 1985 but when the patient was last seen.

The patients were refered to the paediatric cardiology clinic from all regions of Pakistan. The severity of heart disease was classified as mild, moderate or severe. The assesment was based on clinical examination, i.e presence of respiratory distress, Jugular venous pulse elevation and liver size, cardiomegaly on plain chest x-ray film and presence of congestive cardiac failure and pulmonary edema or pulmonary Hypertension. Electrocardiogram and Echocardiogram were used to further define the severity of disease.

Patients with acute Rheumatic fever (ARF) were admitted in the hospital for 5-6 week period. For the first episode of ARF with moderately severe carditis and seriously sick children, prednisone was given in 1-2 mg/Kg daily dose for 1 week then reduced by half for the second week and reduced by ¼ for the next 2-3 week and then gradually discontinued over 6 week period. Prednisone was also given to all patients with myocarditis, pericarditis and congestive heart failure. Aspirin was not given concurrently with prednisione but added later when prednisone was being trailed off. The dose of Aspirin was 75-100 mg/Kg/day in four doses administered after meals and was continued for a period of 4-5 months or untill Erythrocyte Sedimentation Rate (ESR) had returned to normal. Patients who did not require prednisione were administred Aspirin at the initiation of treatment. Bed rest was advised for all patients with carditis. Ambulation was begun when signs of congestive cardiac failure had been controlled with Digoxin, Frusamide and oral vasodilators such as Isosorbide dinitrate. Other indicator for ambulation was the falling ESR and abatement of signs of acute activity.

Intramuscular long acting Penicillin such as penidure LA 1.2 million units was administred at admission for greater than 60 pound weight children and 0.6 million units for less than 60 pound Wt children. This dose was repeated at 2 weeks interval and than at 4 weekly intervals.

Desperately sick children with congestive cardiac failure, vomiting or abdominal pain were given intravenous drugs such as Digoxin and Frusemide for cardiac failure and intravenous Hydrocortisone for Rheumatic activity. Intravenous therapy was continued till abdominal pain and vomitting subsided. Abdominal pain and vomitting was considered a serious complication and was present in children who died due to acute Rheumatic activity.

Results:—

Two hundred and forty nine patients were included in the study. The mean age at presentation was 9.7 ± 2.1 years (range 4-14 years). Eighty one patients were seen only once and 168 patients were followed for 0.2 - 5 year period. The follow up period was 2.1 ± 1.3 years for 149 patients and 19 patients were followed for less than 0.2 years duration; mean 0.096 ± 0.03 years.

One hundred and fourteen patients required admission in the Hospital. Sixty nine patients were admitted once, twenty three twice, and 22 more than three times. The diagnosis was made by history, clinical examination, Electrocardiography and chest x-ray film in 249 patients, and confirmed by Echocardiography in seventy five (30%) and cardiac Catheterization in 12 patients (4.8%).

The mode of presentation was analysed for these 249 patients (Table I). Acute Rheumatic fever was diagnosed in 95 patients by history of

arthritis and or arthralgia severe enough to interfere with child's locomotion; carditis; raised Antistreptolysin "0" titre and raised Erythrocyte sedimentation rate (positive laboratory). History of preceeding throat infection was only occasionally elicited. Twelve patients in this group of 95 patients had no carditis (valvulitis) and Eighty three patients had Evidence of valvulitis.

First episode of acute Rheumatic fever was noted in 69 of 83 patients and 26 patients had recurrent acute Rheumatic episode at the time of initial presentation (Table II & III). The distinction between first episode and recurrent Rheumatic fever was based on previous history of fever and Arthritis or presence of stenotic lesions when previous history was not abilable. Twenty of 69 patient (29%) with first episode of ARF presented in congestive cardiac failure. Mitral regurgitation was the most common single lesion and occured in 47 of 69 patients, mitral regurgitation and Aortic regurgitation was present in 5 patients and Isolated Aortic regurgitation in four patients. Four patients presented with chest pain due to pericarditis with effusion and had Evidence of mitral regurgitation. One patient had congenital lesion i.e TFA with ventricualr septal defect. Twelve patients presented with tachycardia, fever, arthralgia and positive laboratory tests but no evidence of valvulitis(Table II.) Recurrent Rheumatic fever was diagnosed in twenty Six patients, fifteen of these had mitral regurgitation, Six had mitral and Aortic valve regurgitation and four had significant mitral stensis and associated mitral regurgitation. One patient had Isolated Aortic valve regurgitation. Congestive cardiac failure was present in Six of 26 patients (Table III).

The second grup of 134 patients presented with evidence of carditis and positive history of joint pains and fever but ESR and ASOT were within normal range at presentation (Table 4). Twenty of these patients presented with history

TABLE 1

MODE OF PRESENTATION OF 249 PATIENTS WITH RHEUMATIC FEVER

Acute Rheumatic fever :		
Group I + ve history, + ve lab		95
a. With carditis	83	
b. Without carditis	12	
Rheumatic fever + Carditis :		
Group II + ve history — ve lab		134
1. + ve history less than 5 months	20	
2. + ve history more than 8 months	74	
3. + ve history ? duration.	40	
Recurrent Rheumatic Carditis		
Group III — ve history — ve Lab		20
		249

TABLE 2

CARDIAC LESIONS IN 69 PATIENTS WITH FIRST EPISODE OF ARF

Lesion	N	%
Mitral regurgitation (MR)	47	68.1
MR/Aortic regurgitation	5	7.2
AR	4	5.8
CHD + ARF	1	1.4
No carditis	12	17.4
	69	

TABLE 3

CARDIAC LESIONS IN 26 PATIENTS WITH RECURRENT RF

Lesion	N	%
Mitral regurgitation (MR)	15	57.7
MR/Aortic regurgitation (AR)	6	23.1
Mitral stenosis/MR	4	15.4
AR	1	3.8
	26	

TABLE 4.

ANATOMIC LESIONS IN GROUP II PATIENTS

Lesion	N
Mitral regurgitation (MR)	84
Mitral stenosis (MS) / MR	16
Mitral stenosis	13
MR/Aortic regurgitation (AR)	11
MS/MR/AR	5
AR	5
	134

TABLE 5.

ANATOMIC LESIONS IN GROUP III PATIENTS

Mitral stenosis (MS)	8
MS/MR (Mitral regurgitation)	6
Mitral regurgitation	3
Aortic regurgitation/MR	2
MS/AR	1
	20

TABLE 6

TYPES OF ANATOMIC LESIONS

Lesion	N	%
MR	149	59.8
MR/AR	24	9.6
MR/MS	15	6.0
MS	21	8.4
MS/MR	11	4.4
MS/AR	1	0.4
MS/AR/MR	5	2.4
AR	10	4.0
No Carditis	12	4.8
Congenital Heart disease.	1	
	249	

of joint pains and fever of less than 5 month duration and 74 had history of greater than 8 month duration. Forty one patients remembered episode of joint pain and fever but did not recall details or timming of the illness. The dominant lesion in this group was mitral regurgitation occuring in 84 of 134 patients (63%), followed by mitral valve stenosis and mitral regurgitation and Isolated mitral stenosis in descending order of frequency. Isolated Aortic regurgitation was the least common lesion occuring in only 4 of 134 patients.

The third group of patients with Rheumatic carditis presented with evidence of valvulitis but no preceeding history of joint pains or fever could be elicited and ESR and ASOT titre were within normal limits at the time of presentation. There were twenty patients in this group (Table V). Mitral stenosis was the commonest lesion occuring in 8 patients followed by, mitral stenosis and mitral regurgitation in 6 patients. The spectrum of valve lesions and intra operative morphologic features of stenotic mitral valve suggests that these were Rheumatic in etiology.

Pericarditis with mitral insufficiency was noted in 4 patients included in group I. There was moderate to large pericardial effusion. Erythema marginatum and Rheumatic nodules or prolonged PR interval on the Electrocardiogram were not observed in any patient. The diagnostic value of prolonged PR interval could not be assesed since detailed ECG reading was not performed routinely. Rheumatic chorea was observed in one patient who did not have signs of valvulitis.

The most frequent lesion amoung the groups was Isolated mitral insufficiency which occured in 59.8% of cases. Isolated mitral stenosis was noted in 8.4% and Isolated Aortic regurgitation was present in 4% Table VI.

Tricuspid regurgitation was noted in 10 patients all of whom had severe pulmonary artery Hypertension. All of these patients had critical mitral stenosis. Mitral stenosis alone or in combination with other valve lesions was present in 53 (21%) cases. The mean age of the patients with mitral stenosis was 9.9 ± 2.3 years, range 7-14 years. In 21 patients Isolated mitral stenosis was present, mean age of 9.5 ± 1.5

TABLE 7

GEOGRAPHIC PROFILE OF RHEUMATIC HEART DISEASE REFERALS, 1980 - 1985.

Sindh	N	%
Karachi	181	77
Interior	15	6
Punjab	13	5
Balauchistan	12	5
Sarhad (Frontier)	8	3
Unknown	20	8
	249	

years and in 10 associated mitral regurgitation was present, mean age 10.6 ± 1.8 years. In 16 patients, age 10.4 ± 2.1 years, mitral regurgitation was the dominant lesion in association with mitral stenosis.

Geographic distribution of Patients:—

Majority of patients, 181 of 249 patients, came from Karachi and only 15 patients were refered from sindh interior. Few patients were sent from Sarhad, Punjab and Balauchistan (Table VII). In 20 patients the address was not recorded. Analysis of data of Karachi referals showed that overwhelming mjority of patients belonged to Kachi Abadis; New Karachi, Malir, Landi and Korangi town had the heaviest concentration of Rheumatic patients. The patients were however scattered through out the poor communities in the city (Table 8).

Presentation:-

The delay between the onset of fever and arthralgia and presentation at the NICVD could be determined in 188 of 249 patients. Only nineteen patients (10%) presented within 4 weeks of the onset of symptoms and 118 (63%) presented between 4 weeks to six months, mean 2.6 ± 1.6 months. Twelve (6%) had a delay between 7-12 months and 39 patients (21%) presented after one year of the onset of illness.

TABLE 8

GEOGRAPHIC PROFILE OF RHEUMATIC HEART DISEASE KARACHI REFERALS, 1980 - 85.

New Karachi	15
Malir	20
Landi	13
Korangi	10
Liaqatabad	9
Muhajir Camp	6
Nazimabad	6
Ranchore Line	4
Other Localities	98
	181

Severity of cardiac lesion was evaluated at admission in 213 patients, mild degree of vavular damage was assesed in 48 (23%), moderate in 84 (39%) and severe in 81 (39%) patients.

follow up:—

Congestive cardiac failure at the time of admission was noted in 65 of 249 patients (26%) and congestive cardiac failure was still present in 29 of 168 (17%) patients at the final assesment. Recurrent Rheumatic fever was noted in 9 of 168 patients (5.3%); seventeen of 249 patients died, a mortality of 6.8%. Detailed analysis of the 17 death during the follow up period showed that 8 patients where seen only once, 5 patients were followed for less than 1 year and 4 patients were followed for more than 1 year.

Subacute bacterial endocarditis was noted in 8 of 168 patients (4.8%) during the follow up period, Six of these had mitral regurgitation. Two patients with bacterial endocarditis died. Causes of death on medical follow up were analysed and showed that majority 8 of 17 died due to cardiac failure consequent to Acute Rheumatic activity and majority of these had two or more valve lesions. Bacterial endocarditis (2 patients), pulmonary edema (2 patients),

TABLE 9

CAUSES OF DEATH OF PATIENTS WITH RHEUMATIC CARDITIS, MFU, 1980 - 1985.

Infective Endocarditis (Mr: MR/AR)	2
Pulmonary edema (MR,AR; MR)	2
Acute Rheumatic fever (CHF)	8
(3) MR; (2) MR + Pericarditis; (MR/MS, AR) AR/MR, TR Jaundice MR severe.	
Complete heart block (A. R. F)	1
Cerebral Embolism (MS); Hemiparesis	1
Recurrent carditis (MR, CHF)	3
	17

MFU = Medical Follow up.

TABLE 10

CLINICAL ASSESMENT OF SEVERITY AT THE LAST ATTENDANCE

	N	%
Improved	18	15
Unimproved	64	55
Deteriorated	35	30
	117	

severe CHF (1 patient), cerebral embolism (1 patients), and Digoxin over dose (1 patient) accounted for the remaning deaths (Table IX).

Assesment of the severity of disease at first and final visit was compared in 117 of 168 patients. Improvement was noted in only 18 (15%) and 64 patients (55%) remained unimproved and actual deteioration in the severity was noted in 35 patients (30%). Of the 18 patients who showed improvement on follow up, ten had congestive cardiac failure and in 10 showed actual improvement in valve damage. Two patients lost the murmur of mild mitral regurgitation at 1.5 to 2.5 years of follow up.

Cardio thoracic ratio, on chest x-ray film, was available at 1st and last assesment in 43 patients and showed that CT ratio (0.53 ± 0.02) at the initial assesment was smaller compared to CT ratio (0.61 ± 0.02) at the final assesment. Twenty four patients underwent cardiac surgery with three immediate deaths and two late deaths. Nine patients had mitral valve annuloplasty and repair. The average follow up period of surgically treated patients was 2.9 ± 2.6 years; (range 0.3 to 5 years).

DISCUSSION

Geographic Distrubution:–

Our data, althogh referal biased, suggests that over whelming majority of patients with Rheumatic carditis resided in the poor communities of Karachi city. The patients belonged to lower socioeconomic strata since majority lived in Kachi or semi developed communities. Other parameters of socioeconomic status such as earning capacity housing conditions, or family size was not determined and can be only indirectly infered. Significant delay from the onset of symptoms to the time of presentation at the NICVD suggests lack of understanding regarding the importance of fever and joint pains. The stage of tonsillitis was not even recalled probably because mild illness is not considered serious enough for medical attention and is an indication of how poor communities deal with minor infections and fever in their children.

Medical help was not saught at the sore-throat stage and in many instances it may not be easily available. Irregularity of clinic visits and lack of drug compliance may be due to the lack of finances required for travel from home to the hospital. In many instances this incurrs loss of days wages for the fathers. Lack of facilities for home help for mothers who would bring the child to the hospital for clinic visit is again a factor contributing to the irregularity of follow up visits.

Mode of presentation:–

The delay in seeking medical advise, from the onset of disease i.e fever and joint pains and presentation, posed a diagnostic problem because the features of Rheumatic fever and carditis had

been modified by then and the raised ESR & ASOT had returned to normal. The history of preceeding events and even the timing of the present event was not recalled with precision. The rarity of some major main festations of acute Rheumatic fever such as nodules and erythema marginatum has previously been (2-6) commented. The mode of presentation of acute Rheumatic fever was therefore variable as suggested by various modes of presentation of our patients. Most of our patients did not present with fever and joint pains but with the symtoms resulting from carditis namely cardiac decompensation, tachycardia and shortness of breath.

A large number of patients in group II had acute Rheumatic fever for more than eight months and some presented after few years of the event of acute Rheumatic fever. In this group the presentation was not of ARF but its sequelae namely carditis. In approximatly a third of these no definite date of an event such as fever or joint pain or Tonsillitis could be elicited. Therefore it seems to us that all patients with carditis should have, throat culture, ESR and ASOT estimation so that Rheumatic activity can be detected, since in significant number of patients the dating of onset can not be determined.

The third mode of presentation concerned those children who present with delayed complications of carditis. The group was small, 20 out of 249 patients, and the common lesion in this group was mitral stenosis. Obviously a significant period must have lapsed between the onset of disease and development of mitral stenotic lesions. Although, ages could not be precisily determined in our patient population, since recall of parents memory had to be ralied upon for age determination, we have seen children as young as 7-8 year age with mitral stenosis who required mitral valvotomy. The question that may be raised is whether these stenotic mitral valves are congenital or acquired. There are significant anatomic differences however which suggest that these valves are affected by Rheumatic affection. The mitral valve annulus was normal and on Echocardiogram leaflet fusion could be observed, the leaftlet size was not significantly reduced and leaflets were thickened, at the edges due to fibrotic process. Chordae tendinae were short and the left ventricles was usually of a adequate size at surgery and papillary muscle abnormalities were not present further more, close mitral valvotamy could be successfully performed. These valves have been observed intraoperatively in few cases and showed features of commissural fusion and thicking. Further more group 1 patients with acute Rheumatic fever included patients with mitral stenosis due to recurrent acute Rheumatic fever ; all this may not be a direct evidence but, coupled with unusually high incidence of mitral stenosis in younger age, provides a strong evidence for Rheumatic etiology. Wee have only one patient with congenital cardiac malformation (L-Transposition ventricular septal defect) and positive history and positive laboratory tests. Further more only a minority, 15 of 53 patients, with significant mitral stenosis did not have either a positive laboratory tests and positive history of fever and joint pains. Majority of patients with mitral stenosis had a positive history and positive laboratory tests.

medical follow up:–

Comparison of the initial and final assesment of the severity of cardiac lesions showed that only minority of patients showed improvement in symptoms and even smaller number showed actual healing of the lesion. The follow up period however may be too short to expect healing in significant number. The most discouraging aspect of the follow up is that majority of patients either remained unimproved or actually deteriorated, as far as the severity of lesions is concerned. This lack of improvement, recurrent episodes of cardiac decompensation and recurrent acute Rheumatic fever (8.9%) during the follow up period suggests non compliance with cardiac medications as well as penicillin prophylaxis. We have observed that in this group of patients with chronic disease once Digitalis and anticongestive measures have improved symptoms, drugs are discontinued by the patients and medical follow up is abandoned. Our admission records show that nearly fifty percent of patients during the follow up period required two or more admissions for cardiac decompensation or recurrence of Rheumatic fever. Admittedly some degree of the lack of improvement in the disease process may be related to the initial severity of cardiac damage since the valvular damage was assesed to be moderate to severe in degree in 75% of patients.

However socioeconomic constraints account,

in large measure, for the irregular clinic visits, non compliance of maintenance drugs and penicillin prophylaxis. It seems to us that hospital based Isolated pilot programmes even if they can be laced with adequate personnel and drugs will not alter the natural course of Rheumatic carditis in our communities.

Our data shows that in our social setting once Rheumatic carditis has accurred the chance of relief or cure are small and therefore efforts at primary prevention need to be initiated.

Primary prevention involves treatment of streptococcal tonsillitis. We believe that educational efforts in informing the public of the danager of sore throat should be instituted and medical personnel should be made aware of treating sore throat diligently. It is our feeling that where culture facilities are available, all cases of tonsillitis and pharyngitis should have throat swab taken and treatment advised according to the culture report which should be available within 24 hours. If B-haemolytic streptococci are grown, treatment with oral penicillin is given for 10 days. If no culture facilities are available all cases of clinical tonsillitis and pharyngitis should be given a 10 day course of oral Penicillin. Penicillin is cheap and safe. One may be over treating viral tonsillitis but cases of streptococcal tonsillitis will not be missed. Improvement in socioeconomic conditions should be the final goal of any society. These are long term objectives but in the interim treatment of tonsillitis or pharyngitis should be undertaken seriosly. Parents, physicians and paramedical personnel should be made aware of this need through communication media, Radio, Television and new media.

Role of surgery:—

There are quite a few options as far as surgical procedures are concerned. Simplest of these is close mitral valvotomy. It is the most economical and effective means of relieving symptoms and improving excercise capacity in our geographic setting. It however leaves the valve in damaged state and also prone to recurrent Rheumatic activity and bacterial endocarditis and restenosis. In our small series mitral valvotomy has born the best results, however, its place in management of Rheumatic valvular disease in children is limited since only 8.4% of our patients had pure mitral stenosis. The other surgical options require open heart procedure and cardiopulmonary bypass.

Commonly mitral regurgitation is the lesion which requires surgery. In our series more than half of children had isolated mitral insufficiency. There are 2 surgical options to deal with regurgitant mitral valve. The first option is to repair the valve and perform annuloplasty that is narrowing of the valve annulus. The advantage of this procedure is that patients own valve is left in place and post operative anticoagulants are not required. Our preliminary results show that significant symptomatic relief can be abtained, although hemodynamics are not completely restored to normality. We believe that increasing surgical expertise in this regard is bond to lead to more fruitful out come and that valve repair is a feasible option in our socioeconomic setting. The second surgical option to deal with mitral regurgitation is to replace the valve with tissue valve or metal valve disc or ball type prosthesis. The medical constraints placed on the patient after the valve replacement are too great for these group of patients ; there is the burden of anticoagulant therapy and repeated prothrombin time estimations and variation of the dose of anticoagulants and repeated doctor visits to ensure the functioning and viability of the valve, at a specialised hospital not in reach of the patients in farther areas of our villages. We do not believe that, even though near normal Hemodynamics can be achieved by the valve replacement, that it is of a lasting value and economically and logistically a sound form of therapy in our socioeconomic setting.

Our data shows that careful medical management results in identical mortality when compared to surgery. Therefore Rheumatic carditis should be managed medically whenever possible because the surgical options are not entirely satisfactory in our geography.

In conclusion our study shows that Rheumatic carditis is usually severe and is associated with significant morbidity and mortality. Even a careful medical and surgical managemnt of these patients has not produced any significant improvement or cure. Recurrent Rheumatic fever and recurrent cardiac decompensation

episode, due to non compliance of drugs, continue to characterise the natural history of Rheumatic carditis. In our geography, the prognosis of a child with Rheumatic carditis remains guarded.

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