Sick Sinus Syndrome

Pages with reference to book, From 220 To 225

Husnain Sherazi, Juma Gul Haidry, Muhammad Ilyas, Nasir Ali (Muhammadi Hospital, Peshawar.)

Abstract

During the period 1972-80, 41 cases of sick sinus syndrome were studied; including 30 males and 11 females, 4-92 years old (mean 56 years), and the majority (67%) were treated as day-patients. Weakness (44%), palpitations (17%) and syncope (15%) were the commonest clinical presentations. Sinus bradycardia (44%), sinus arrest (37%) and extrasystoles (34%) were the commonest E.C.G. findings. Associated diseases were coronary heart disease (17%), familial (11%) and rheumatic (3%): Long acting isoprena-line tablets were given to 14 (34%) cases beta-blockers to 9 (22%) and 3 (7%) received permanent pacemaker implantation. Eleven (27%) cases died during the follow-up period of 1-5 years; with syncope (10%), cardiac failure (9%) and sudden death (4%). (JPMA, 31:220, 1981).

Introduction

Lown (1967) first coined the term sick sinus for failure of sinus rhythm after cardioversion for atrial fibrillation, and Ferrer (1968) reported the complete account of sick sinus syndrome (SSS). In Pakistan, Yousaf (1958) documented the first case of sick sinus syndrome; Akhtar reported the second case in 1973 and Ilyas et al (1974) used atrial pacing to study sinus node recovery time. Ever since the establishment of diagnostic criteria, increasing awareness has led to frequent reporting of SSS from different parts of the world (Ferrer, 1972; Conde et al., 1974; Wijayawardhana, 1975; Kiriyama et al., 1979; Ischii et al., 1980; Chinese Study, 1980). This paper reports clinical manifestations and follow-up in 41 cases of sick sinus syndrome seen during a 8 year period.

Material and Methods

During the period 1971-80, 41 cases of sick sinus syndrome have been studied, the series consists of 30 males and 11 females, age range 4-91 years (mean 56.5 years). Three cases were 4, 9 and 12 years old, and two 90 years or above, and the rest were 35-68 years old. Twelve cases were hospitalized for treatment, and 29 were treated as out-patients or as day-patients for investigations. The patients belonged to different parts of the Frontier Province and presented with various manifestations of this condition.

Weakness (44%) and palpitations (17%) were the commonest clinical presentations (Table I).

Table I

Clinical Presentation of Sick Sinus Syndrome

	Presentations	*No. of cases*	(%)
1.	Weakness/lethargy	18	(44)
2.	Palpitations	7	(17)
3.	Angina	7	(17)
4.	Dyspnoea	6	(14.6)
5.	Syncope	6	(14.6)
6.	Oedema	4	(9.7)
7.	Dizziness	3	(7.3)
8.	Delirium	2	(4.8)
9.	Others	4	(9.7)
10.	'Asymptomatic'.	8	(19.5)

Electrocardiographic manifestations included sinus bradycardia in 18 (44%), sinus arrest in 15 (37%), sinus irregularity in 14 (34%), ectopics in 14 (34%) and atrioventricular conduction disturbance in 11 (27%) cases (Table II).

Table II

ECG Disorders in Sick Sinus Syndrome

ECG Disorders	*No. of cases*	(%)
1. Sinus Bradycardia	18	(44)
2. Sinus Arrest	15	(37)
With escape rhythm	9	(22)
Without escape rhythm	6	(14.6)
3. Sinus Irregularity	14	(34)
4. Ectopics	14	(34)
5. A-V Conduction Disturbances:	11	(27)
1° A-V block	3	(7.3)
2° A-V block	4	(9.8)
6. Atr. Fibrillation:	4	(9.8)
Intermittment	7	(16.8)
Chronic	2	(4.8)
7. Supraventric. Tachycardia	5	(12)
8. Shifting Pacemaker	7	(17)
9. Nodal Disorder	5	(12)
10. 2:1 S-A block	4	(9.8)
11. Nodal Tachycardia	3	(7.3)
12. Atrial Flutter (intermittment)	2	(4.8)
13. Interatrial Block	1	(2.4)

Diseases etiological ly related to SSS are shown in Table III.

Table III

S.S.S. Associated Diseases

Coronary Heart Disease Acute	Chronic	Surdocardiac Syndrome*	Familial	Rheumatic Heart Disease
5 (12%)	2 (4.8%)	3 (7.3%)	2 (4.8%)	1 (2.4%)

*Cardiac conduction disturbances associated with congenital deafness.

Treatment was given in 30(7.% cases and 11(27%) required no treatment (Table IV).

Table IV

S.S.S. Treatment

Long Acting Isoprenaline	Beta Blockers	Digoxin	Pacing Atrial	Pacing Ventricular	None
14 (34%)	9 (22%)	4 (9.8%)	1 (2.4%)	2 (4.8%)	11 (27%)

A few case histories are illustrated in Figs. 1-5.

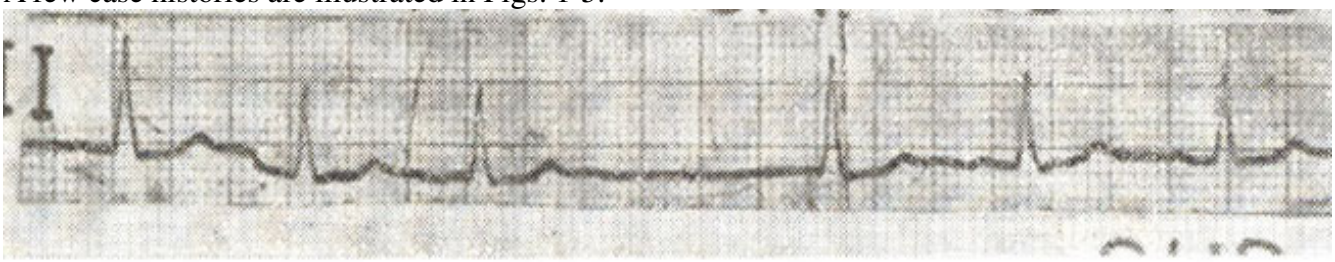

Fig. 1 : Mr. S.F., 50 years, S.S.S. with coronary heart disease. Lead II showing sinus rhythm with nodal escape beats (3rd and 4th).

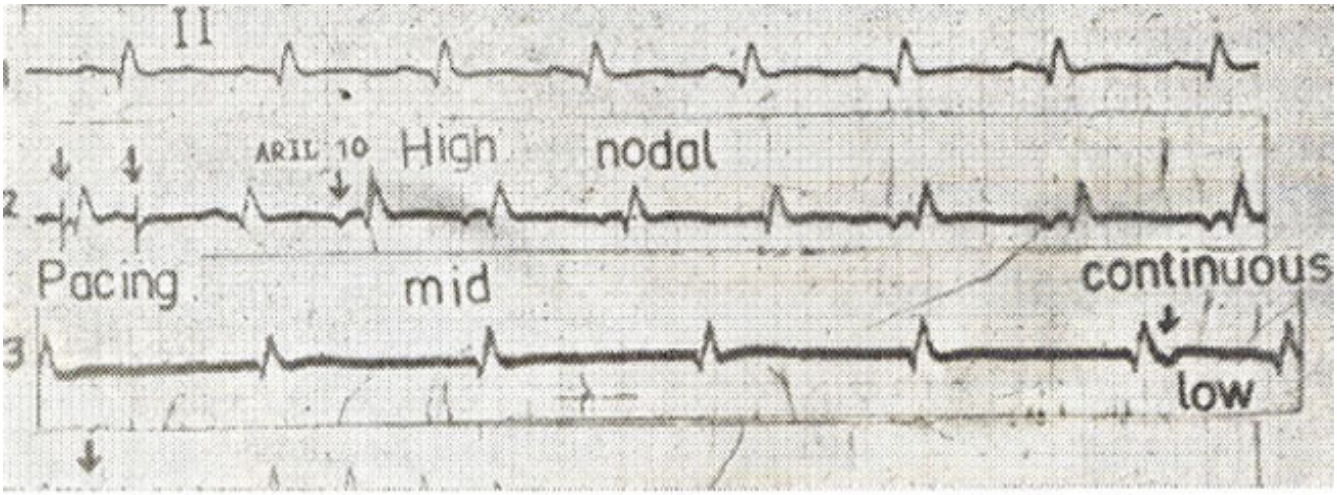

Fig. 2*:* Mr. M.M.B. 55 years S.S.S. with acute myocardial infarction: a. Sinus bradycardia (60/min.), 2-3 (continuous) atrial pacing discontinued with shifting nodal rhythm.

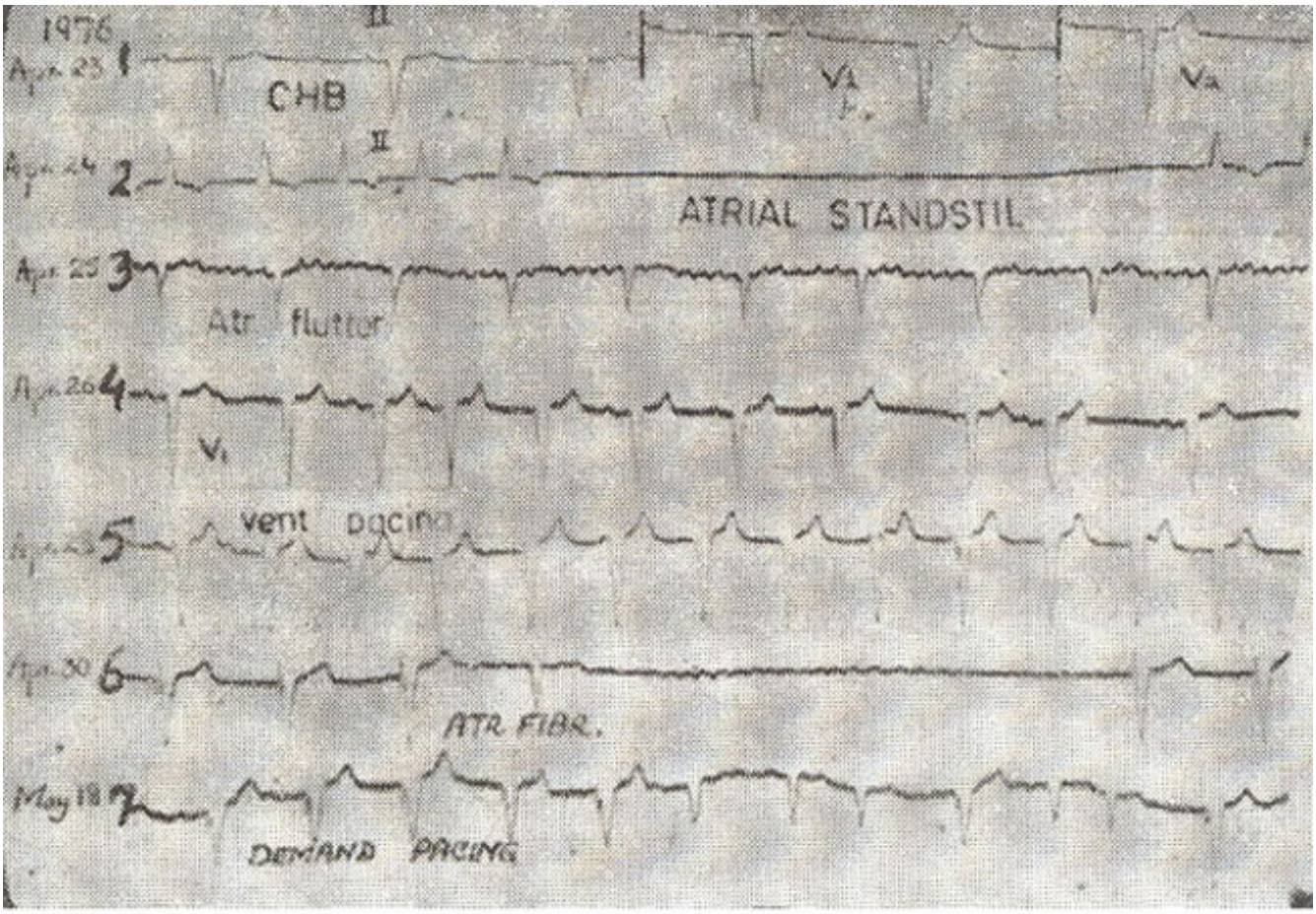

Fig. 3*:* Mr. M.A. 45 years old with S.S.S. 1. Complete atrioventricular dissociation 2. Escape nodal rhythm with standstill 3. atrial flutter 4. Sinus irregularity with nodal beats 5. ventricular pacing 6. Interrupted pacing showing atrial fibrillation with arrest 7. Intrinsic rhythm with atrial fibrillation.

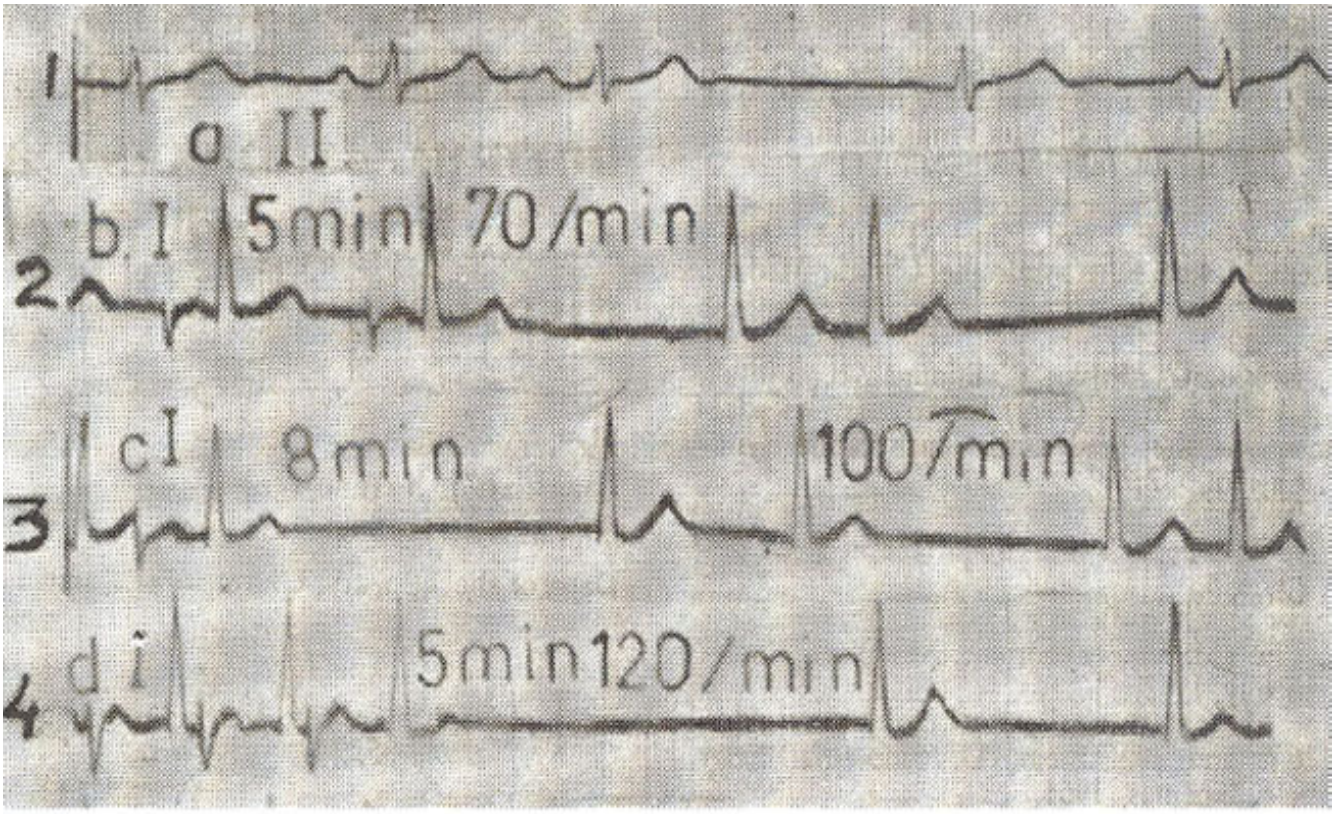

Fig. 4*:* Mr. S.M. 48 years with S.S.S. 1. Sinus irregularity with escape nodal beats 2. atrial pacing at 70/min. with normal sinus node recovery time, 3-4 pacing at 100 and 120/min ,showing delayed sinus node recovery time.

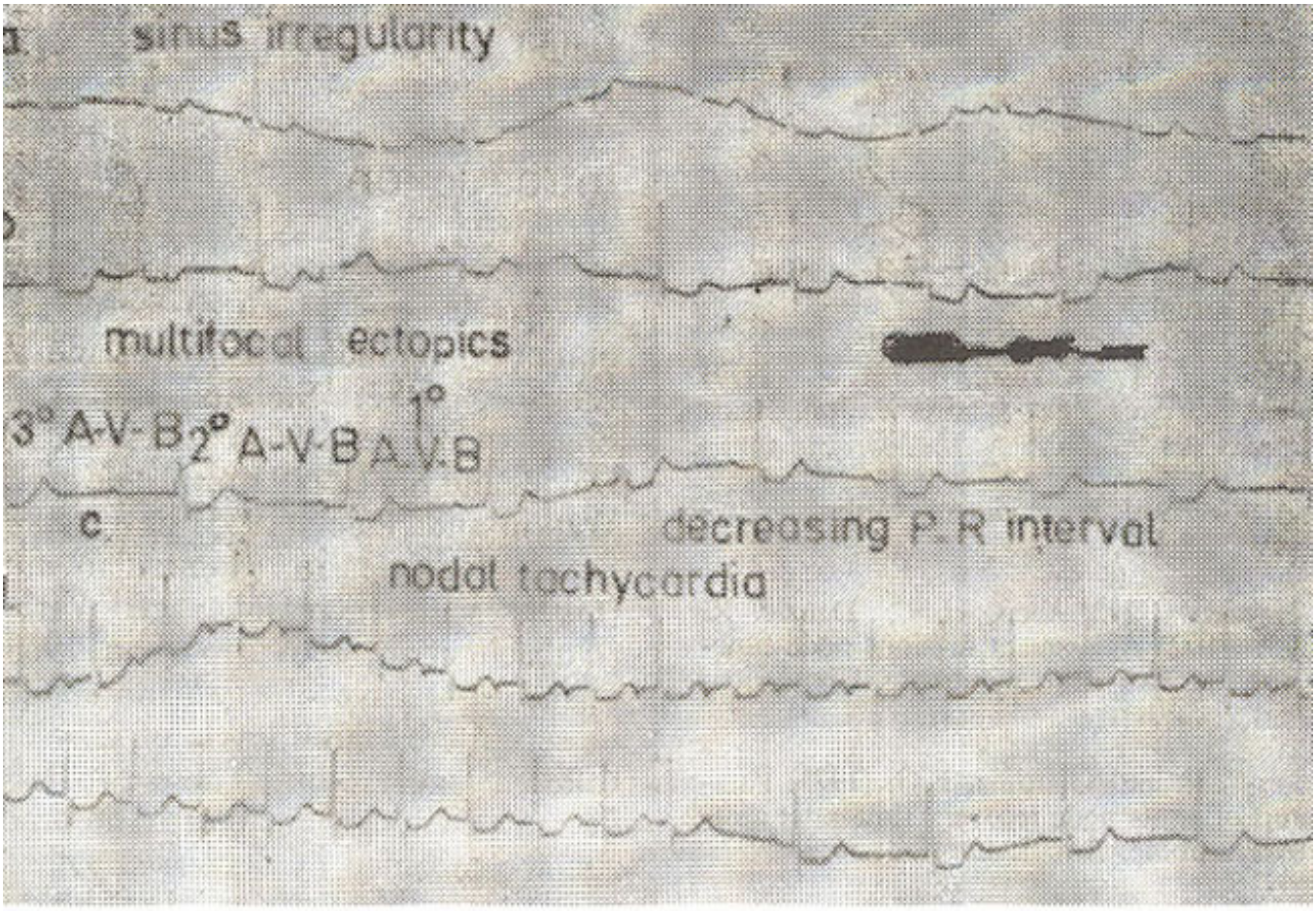

Fig. 5 : Mrs S.M. 45 years with S.S.S. a. Irregular sinus rhythm, b. multifocal extrasystoles, c. varying A-V block, d. Nodal tachycardia (simulating rapid atrial pacing), for 7 minutes, terminating spontaneously with normal sinus recovery time.

Follow-up

Twenty one (51%) cases have been followed up for 1-6 years and are living, and 11(27%) cases have died. The fate of 9(22%) cases remains unknown as follow-up is not available. Thirty six (88% cases had chronic SSS and 5(12%) demonstrated intermittment SSS. The survival-period after a diagnosis of SSS established in 31 cases is shown in Table V.

Table V — S.S.S. Survival After Diagnosis N=31

Years	1	1	2	3	4	5	6	21
Cases	4 (13%)	6 (19%)	4 (13%)	7 (23%)	5 (16%)	3 (9.7%)	1 (3%)	1 (3%)

The causes of death in 11(27%) cases are shown in Table VI.

Table VI

S.S.S. Causes of Death in 11 Cases

Syncope	CCF	Sudden	Others
4 (36%)	4 (36%)	2 (18%)	1 (9%)

Discussion

The term sick sinus was coined by Lown (1967) for failure of sinus rhythm after cardioversion in atrial fibrillation and a complete account of sick sinus syndrome (SSS) was reported by Ferrer (1968). SSS is commoner in older age groups but also occurs in young, and both sexes are equally affected. SSS may manifest as sinus bradycardia, sinus arrest and/or sinoatrial exist block. Chronic atrial fibrillation may replace ceased sinus rhythm and ventricular rate may also be slow. Lone atrial fibrillation without cardiac abnormality specially in the young, may also be due to sick sinus syndrome. Sinoatrial node may die slowly in 5-10 years or more, or more abruptly in coronary heart diseases. Prognosis of SSS is influenced by asystolic episodes, congestive cardiac failure and by the type and response to treatment. Sick sinus syndrome may be associated with congenital deafness, and may be the cause of death in young athletes (James et al. 1967).

Perhaps the first case of SSS in this subcontinent was documented by Yousaf during 1958, ten years before the full description of SSS by Ferrer (1968). This unpublished case of a young doctor, had an extensive follow-up for over 20 years. He remained an active surgeon, and died in a plane crash during 1979 (Ilyas 1981). In this series an incriminating etiological factor was demonstrated in 13(31%) cases. SSS may be familial (Kiriyama et al., 1979). Two of our cases belongedto the same family. In a series of 39 cases of SSS, seen in Colombo during 20 months period, male to female ratio was 1.17:1 (Wijayawardhana, 1975). In a review series of 223 cases of sinoatrial block only 29% had normal cardiovascular system, contrary to the belief of sinoatrial nodal disorder's innocence (Greenwood and Finkel-stein, 1964). In a combined series of 171 cases of SSS in the mainland China the attributing factors were coronary heart disease 91(53%) cases, cardiomyopathy 37(22%) and 38(25%) had undetermined etiology (Chinese Study, 1980).

Provocative tests include response to intravenous atropine and isprenaline and atrial pacing. Elimination of sinus bradycardia by atropine suggests vagal origin and not sinus node abnormality. Post-pacing pause shortening after atropine suggests vagal influence. Atropine and isoprenaline are both used as provocative tests and for short term treatment. Demand electrical ventricular pacemaker is the treatment of choice. For associated tachyarrhythmia some A-V blocking for atrial fibrillation flutter or tachycardia is required. Fast atrial pacing at rates 100-160/min. for5 minutes may lead to prolonged period of asystole, upto 2 seconds, in sick sinus syndrome (Narula et al., 1972).

Atropine i/v (1-2 mg) increases the sinus rate by 10-15 beats (not over 90/min. heart rate) in cases of SSS. But in sinus bradycardia, due to extracardiac factors and drugs, greater increase in heart rate is recorded. Paradoxically, atropine may prolong sinus node recovery time or replace sinus rhythm by

junctional rhythm when atrial pacing is suddenly stopped, (Reiftel et al., 1975). This may be due to concealed or altered conduction within the S-A node.

Electrophysiological effects of lignocaine in 40 cases of SSS showed that the corrected sinus node recovery time (CSRT) increased significantly and lignocaine directly depressed sinus automaticity; combined atrial pacing and lignocaine may expose masked sinus node abnormalities, and lignocaine should be used with caution in patients with known or suspected SSS (Ischii et al. 1980).

Experimentally, it has been demonstrated that the dominant sino-atrial conduction takes place through the connectable area of the sinus, node with the right branch of crista terminalis and that functional impairment of this area leads to sinoatrial block of various degrees (Hiraoka et al., 1980). In a study of conduction system of two adolescent boys who died with SSS the approaches to the S-A and A-V nodes and the atrial preferential pathways were altered by fibrosis in one and by fatty infiltrations in the other (Bharati et al., 1980).

Verapamil administered intravenously in normal sinus node slightly prolongs S-A recovery time; and in patients with SSS marked depression of sinus node function is produced, and this drug is contraindicated in atrial arrhythmias and supraventricular tachycardia of SSS. Digoxin does not necessarily influence sinus bradycardia in SSS, but with coexisting A-V block digoxin should be used with implanted pacemaker. Digoxin administered after atropine (vagal blockade) in patients with sinus nodal dysfunction increases sinus cycle length, sinoatrial conduction time and maximal corrected sinus recovery time.

References

1. Akhtar, A.H. (1973) Analysis of electrocardiogram of a case of sinoatrial heart block. Pakistan Heart J., 6:47.
2. Bharati, S., Nordenberg, A., Bauernfield, R. Varghese, J.P., Carvalho, A.G., Rosen, K. and Lev, M. (1980) The anatomic substrate for the sick sinus syndrome in adolescence. Am. J. Cardiol., 46:163.
3. Chinese Study: Editorial Board Panel (1980) Diagnosis and management of sick sinus syndrome. Chinese Med. J., 43:495.
4. Conde, C.A., Leppo, J., Lipiski, J., Stimmel, B., Litwak, R., Donoso, E. and Dack, S. (1974) Effectiveness of pacemaker treatment in the bradycardia-tachycardia syndrome. Am. J. Cardiol., 32:209.
5. Ferrer, M.I. (1968) The sick sinus syndrome in atrial disease. JAMA., 206:645.
6. Ferrer, M.I. The sick sinus syndrome. New York, Futura Publishing Company, 1972.
7. Greenwood, R.J. and Finkelstein, D. Sino-atrial heart block. Springfield, Thomas, 1964.
8. Ilyas, M., Peracha, M.A., Yousafzai, R.A. and Ali, N. (1974) Atrial pacing for sick sinus syndrome Complicating myocardial infarction. JPMA, 24:274.
9. Hiraoka, N. and Toyomi, S. (1980) Impulses of S-A block area. Jpn. Heart J., 21:717.
10. Ilyas, M. (1974) Sick sinus syndrome: JPMA., 24:167.
11. Ilyas, M., Khan, S.M, Sherazi, S.M.H. et al. (1980) Car-dioauditory syndrome: Case reports and epidemiological study JpMA., 30:159.
12. Ilyas, M. (1981) Sick sinus syndrome: 21 Years follow-up JPMA., 31:212.
13. Ischii Y., Mistuda, H. Eno, S. et al. (1980) Electrophysiological effects of lidocaine in sick sinus syndrome. Jpn. Heart J., 21:27.
14. James, T.N. ,Forggatt, P. and Marshall, T.K. (1967) Sudden death in young athletes. Ann. Intern. Med., 67:1013.
15. James, T.N. (1967) Congenital deafness and cardiac arrhythmias. Am. J. Cardiol., 19:627.
16. Kiriyama. T., Mizutani, T., Kakusui, K. et al. (1979) Familial heart block and sick sinus syndrome. Jpn. Heart J., 4:441.

17. Lown, B. (1967) Electrical reversion of cardiac arrhythmias. Br. Heart J., 29:469.
18. Mandel, W.J., Hayakawa, H., Alien, H.N., Danzig, R. and Kermaier, A.I. (1972) Assessment of sinus node function in patients with the sick sinus syndrome. Circulation, 46:761.
19. Reiffel, J.A. Bigger, T.J. and Giardina, E.G. (1975) Paradoxical prolongaton of sinus node recovery time after atropine in sick sinus syndrome. Am. J. Cardiol., 36:98.
20. Wijayawandhana, U.D. (1975) The sick sinus syndrome Trans. R. Coll. Physns., 8:1.
21. Yousaf, M. An unusual case of sinus arrhythmia; records of the Mayo Hospital. Lahore, Dec. 16, 1958.