RUPTURED ANEURYSM OF THE SINUS OF VALSALVA. 15 YEARS EXPERIENCE AT NATIONAL INSTITUTE OF CARDIOVASCULAR DISEASES, KARACHI.

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ABSTRACT

Between 1983 and 1997, a total of 43 cases of ruptured aneurysm of sinus of valsalva underwent surgical correction at NICVD, Karachi. This represents 0.6% of all the cardiac operations. Mean age of presentation was 31 year. The origin of aneurysm was right coronary sinus in 39(91%) and non coronary sinus in 4(9%) cases. Aneurysm ruptured into the right ventricle in 38(88.3%) and into the right atrium in 5(11.7%) cases. Associated cardiac pathology was ventricular septal defect in 16(37.2%) and Aortic regurgitation in 23(53.4%) cases. Repair of the aneurysm was done transaortically in all the cases. VSD repair was accomplished transaortically in 5(31.25%), through right ventriculotomy 9(56.0%) and transatrially in 2(12.5%) cases. Aortic valve was replaced in 56% and repaired in 30.2%. We lost 3(6.97%) of our cases. 2, patients has residual leakage from the aneurysm repair site. Both had direct repair of aneursym. CONCLUSION: RASV should be promptly repaired once the diagnosis is made. Aneurysm defect should be repaired with patch unless it is small one. PJCTS 1999;1: 18-21

INTRODUCTION

Aneurysm of the sinus of valsalva is a rare congenital cardiac anomaly. It accounts for 0.1% to 3.5% of all the congenital cardiac defects[1,2,3]. No age is immune but majority of cases present in the third decade of life[4]. Importance of early diagnosis lies in the hemodynamic consequences of rupture leading to rapidly progressive heart failure. Successful repair of ruptured aneurysm of the sinus of valsalva RASV was described by Lillehei, Stanely and Varco[5]. Experience accumulated at the National Institute of Cardiovascular Diseases (NICVD) Karachi in managing the RASV was reviewed and is presented.

PATIENTS AND METHODS

During the period between 1983 and 1997 a total of 43 cases of RASV underwent surgical correction at the NICVD, Karachi. The age ranged from 17 to 51 years, with a mean of 31 years. There were 35 male and 8 female patients. Among the clinical features dyspnea and palpitations were the most common symptoms. A loud continuous murmur accompanied by a coarse thrill along the left parasternal border was the most common physical finding of RASV. Table I. Chest Films showed cardiomegaly in nearly all the patients. Two dimensional echocardiogram revealed involvement of right coronary sinus, (RCS) in 39 cases, and non coronary sinus (NCS) in 4 cases. Aneurysm ruptured into right ventricle in 38 cases and right atrium in 5 cases Table II. Spectrum of associated pathology is shown in Table III.

OPERATIVE TECHNIQUE

Cardiopulmonary bypass was established after aortic and bicaval cannulation. At moderate systemic hypothermia aorta was cross clamped and transverse aortotomy made. Cold crystalloid cardioplegia infused into coronary ostea. The aortic root is visualized and aneurysmal opening identified. Windsock of the aneurysm is inverted and excised at its edges. The resultant opening when small less than 1.0 cm is closed with pledgeted prolene 5/0 suture. Larger defect is closed with dacron patch. Small supra crystal VSD is closed transaortically with pledgeted mattress sutures after retracting the right coronary cusp, (RCC). In case of large VSD right ventricle is opened and dacron patch is used for repair. (Table IV). Aortic regurgitation is corrected by plication of the redundant cusp

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whenever possible. In non repairable cases aortic valve is replaced, either with tilting disc or ball and cage type prosthesis. In one case the right coronary ostea was involved in aneurysm sack and was sacrificed while repairing the defect in aortic sinus. Aorto coronary saphenous vein graft was used to maintain right coronary circulation.

RESULTS

We lost 3 patients. One patient failed to come off bypass. Preoperatively he had severe L.V dysfunction. One patient died of low cardiac output in high dependency unit and the other died of respiratory failure. In all other cases the immediate post operative course was favourable. Two patients had residual leakage from the aneurysm repair site. Both had direct repair of the sinus defect. All patients were discharged with a satisfactory clinical status.

DISCUSSION

Ruptured aneurysm of the sinus of valsalva is a rare lesion accounting for 0.1% to 3.5% of all the congenital heart defects [123]. It is five times more common in oriental than in western countries [6,7,8]. In our series the incidence of RASV was 0.6% of all the cardiac operations. In 80% to 85% of the cases the aneurysm originates from the right coronary sinus and in 5% to 15% from the non coronary sinus [3,9,10]. In our series 91% of all aneurysms originated in the right coronary sinus and 9% in the NCS. Right ventricle was the most common chamber into which the aneurysm ruptured. In only 5 cases the aneurysm ruptured into the right atrium. In our series there was no incidence of left coronary sinus involvement. Among the associated anomalies with RASV ventricular septal defect (VSD) and aortic incompetence are the commonest lesions [3,11,12]. In the present series the incidence of VSD was 37.2% and aortic incompetence 53.4%. Severity of aortic incompentence varies from mild to severe. In our series 48% of the cases had moderate aortic regurgitation and 43% had severe aortic incompetence. Cases having mild aortic incompetence had morphologically normal, nicely co-opting leaflets while moderate to severe aortic incompetence cases had varying degree of structural abnormalities of aortic leaflets. In 30% the involved aortic leaflets was redundant and thickened. In 61% the involved sinus leaflet was markedly thick and distorted. Rupture of the aneurysm can occur at any age but commonly it occurs in the third decade[13,14,15,16]. The youngest reported case of RASV is 9.6 months[4]. Patients with aneurysm of sinus of valsalva usually remain asymptomatic clinically unless the aneurysm ruptures. The onset may be sudden or insiduous[4]. In acute onset patient experiences chest pain and increasing dyspnea. In majority of our cases the onset was insiduous and patients presented with symptoms of congestive cardiac failure. Large majority of them were in NYHA functional class II-III. One of our patient pesented to the physician after he felt vibratory sensations over his chest (thrill). Chen, Lion and Chang have reported cases in which there were practically no complaints and the clinical condition remained satisfactory[17]. Sakakibara and Kono, and Taguchi and colleagues explain the benign course of the disease by pre-existing left to right shunt through an associated VSD, by a small size of the perforation or by the presence of the fistula since birth[18]. Without surgical intervention most patients die within one year of the time of rupture although a few patients may survive for years[19]. Usual cause of death is congestive cadiac failure. Bacterial endocarditis have been reported in 10% of the cases[20]. Different approaches are used for the repair of RASV. Some would open the chamber into which the aneurysm have ruptured[4]. Some use only transaortic approach[21], and still others would use combined approach. We at our institute use combined approach opening both the aorta and the chamber into which aneurysm ruptures. In few cases where there is isolated small aneurysmal sac or combined with a small supracrystal VSD we used only transaortic approach. We use dacron patch for repair of the defect resulting from aneurysmectomy. Direct closure is preferred if the size of the opening is less than 1 cm. Our approach to aortic valve is very conservative. We try to retain the natural valve by repair even if there is mild residual aortic valve leak. Practically we choose the operative procedure for each case individually.

TABLE - I
CLINICAL PROFILE

n=43

Chest Pain	7	(16%)
Dyspnea	39	(91%)
Palpitation	43	(100%)
Asymptomatic	2	(45%)
Bounding Pulse	28	(65%)
Coarse Thrill	43	(100%)
Continuous Murmur	43	(100%)
Ascites	1	(2.3%)

TABLE - II
SINUS INVOLVED AND SITE OF RUPTURE

Sinus	n(%)	Site of Rupture	
		R.V.	R.A.
RCS	39(91%)	38(97%)	1(3%)
NCS	4(9%)	0	4(100%)
LCS	0.0	--	--

RCS= Right Coronary Sinus
NCS= Non Coronary Sinus
LCS= Left Coronary Sinus

TABLE - III
ASSOCIATED PATHOLOGY

n = 43

Pathology	n(%)
VSD	16(37.2%)
AR	23(53.4%)
Patent Foramen Ovale	1(2.3%)
Tricuspid Regurgitation	2(5%)

VSD= Ventricular septal defect, AR, aortic regurgitation.

TABLE - IV
OPERATIVE TECHNIQUE

Sinus defect repair :	
Dacron Patch	33 (76.7%)
Direct Repair	10 (23.2%)
VSD Repair : n=16	
Transaortic	5 (31.2%)
Direct Repair	
Transventricular (Patch)	9(56.0%)
Transatrial (decron Patch)	2 (12.5%)
Aortic Valve : n = 23	
Aortic Valve Repair	7 (30.4%)
Aortic Valve Replacement	14 (60.8%)

CONCLUSION

RASV should be promptly repaired once it is diagnosed, thus halting the deterioration of cardiovascular status. Surgical approach to the lesion should be selected for each case individually keeping in view the anatomy of the aneurysm and the associated anomalies, and the patient clinical status.

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