

발살바동 동맥류 파열의 임상적 고찰

문건식¹ · 최락경¹ · 임달수¹ · 박헌식¹ · 홍석근¹ · 이영탁² · 황흥곤¹

Clinical Characteristics in Patients with Ruptured Aneurysm of Sinus of Valsalva

Keon Sik Moon, MD¹, Rak Kyeong Choi, MD¹, Dal Soo Lim, MD¹, Hun Sik Park, MD¹,
Suk Keun Hong, MD¹, Young Tak Lee, MD² and Hweung Kon Hwang, MD¹

¹Department of Internal Medicine, ²Thoracic and Cardiovascular Surgery, Sejong General Hospital, Puchon, Korea

ABSTRACT

Background : Ruptured aneurysms of sinus of Valsalva are rare cardiac anomaly. Here, we analyze retrospectively patients operated on at our hospital during the last 10 years. **Methods** : Seventeen cases of ruptured congenital aneurysm of sinus of Valsalva (female : male = 10 : 7, mean age 33.2 ± 15.2 year) were operated during the period of January 1989 through August 1998. A ruptured aneurysm of the sinus of Valsalva was diagnosed by transthoracic 2D echocardiography and multiplane esophageal echocardiography. The diagnoses were confirmed at operation. The majority (94.1%) arose from the right coronary sinus. The right ventricle was the most common chamber of rupture (76.5%). Ventricular septal defect was associated in 13 patients (76.5%), of which 8 (61.5%) were subarterial. Ventricular septal defect was more common in aneurysms arising from the right coronary sinus (81.2%). Aortic regurgitation was found in 5 patients (29.4%). One patient underwent aortic valve repair and one an arotic valve replacement. **Results** : There was no early operative death and no recurrence after the initial repair. Postoperative morbidities were few. There was one late sudden cardiac death 3 months post-surgery. In the majority, the long-term follow-up was uneventful. **Conclusion** : Surgery for ruptured aneurysm of sinus of Valsalva yields gratifying results, and it should be undertaken as soon as the condition is diagnosed. With recent developments, echocardiography may prove a substitute for cardiac catheterization and angiography in future, and surgery could be undertaken with the help of echocardiography alone. (**Korean Circulation J 2000;30(2):183-190**)

KEY WORDS : Ruptured aneurysm of sinus of valsalva · Congenital heart disease · Transesophageal echocardiography.

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: (032) 3401 - 114 · : (032) 349 - 3005

E - mail : mkszoom@unitel.co.kr

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10

대상 및 방법

1989 1 1998 8
 17 21 가
 10
 4,816
 0.35% . 17 15
 , 2
 17 가 7 (41%, 29.2 ± 11.1), 가 10
 (59%, 36.0 ± 17.6) 1 : 1.4
 11 66 33.2 ± 15.2
 (Fig. 1). 7 2 26 (
 10.8 ± 10.6) 10
 100 (32.6 ± 37.9)
 , , , ,

결 과

임상 증상 및 검사 소견

10 (58.8%), 2 (11.7%),
 2 (11.7%), 1 (5.8%), 1
 (5.8%)
 1 (5.8%) . 14 (82.3%)
 , 3 (17.6%)

New York Heart Association(NYHA)

class 4 (23.5%), class 가 10
 (58.8%), class 가 2 (11.7%), class IV가 1
 (5.8%) .
 가 9 (52.9%) 가 ,
 4 (23.5%) 4 (23.5%) .

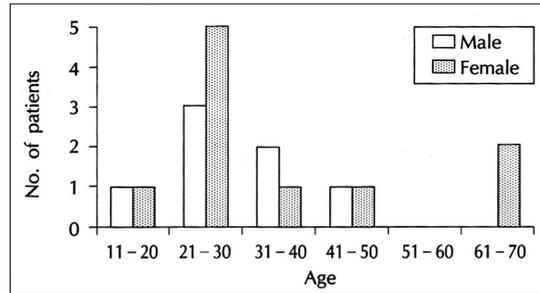


Fig. 1. Age distribution.

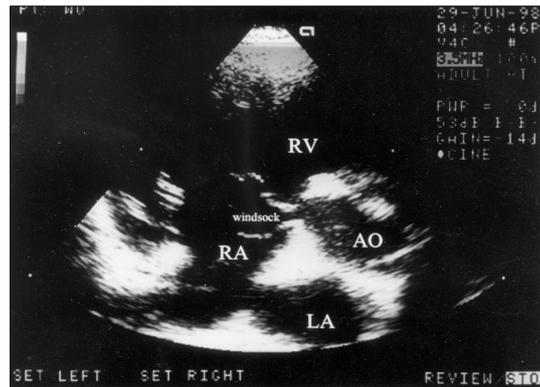


Fig. 2. Transthoracic echocardiogram shows windsock-like aneurysm originated from right Valsalva sinus into right atrium in right ventricle inflow view.

2 (11.7%), 1 (5.8%)
 . 15 (88.2%)
 (CT ratio>0.55) 가
 2
 9 (52.9%), 1 (5.8%), 1
 1 (5.8%), 1 (5.8%),
 1 (5.8%), 4 (23.5%) .

심초음파 소견

(transthoracic ech-
 ocardiography) (Fig. 2),
 (multiplane transesop-
 hageal echocardiography) (Fig. 3).
 13
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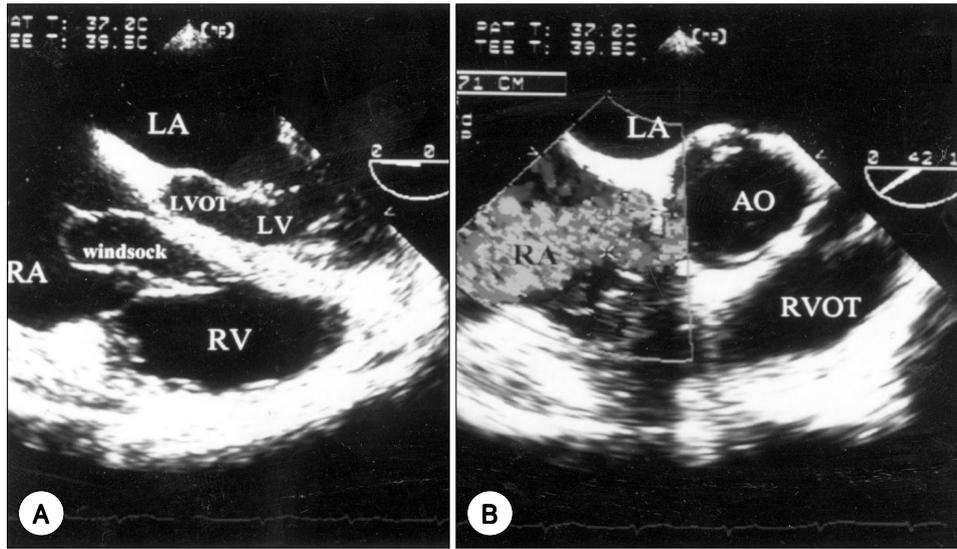


Fig. 3. Transesophageal echocardiogram shows windsock-like aneurysm of sinus of Valsalva in horizontal view (A). Color jet from aorta into right atrium is observed (B).

2
, 2
(Table 1). 15 (windsock)
2
streptococcal viridans가
(subarterial) (vegetation),
1
Qp/Qs = 1.8
1990

Table 1. Findings at Echocardiography and surgery

	Echocardiography (n=17)		Surgery (n=17)	
	number	%	number	%
Sinus of origin				
RCS	14*	82.3	16	94.1
NCS	1	5.8	1	5.8
LCS	0	0.0	0	0.0
Chamber of rupture				
RV	11*	64.7	13	76.4
RA	3	17.6	3	17.6
LV	1	5.8	1	5.8
LA	0	0.0	0	0.0
Uncertain	2	11.7	RASV	

*2 Cases were diagnosed by transesophageal echocardiography

RCS = Right Coronary Sinus ; NCS = Noncoronary Sinus ;
LCS = Left Coronary Sinus ; RV = Right Ventricle ; RA =
Right Atrium ; LV = Left Ventricle ; LA = Left Atrium ;
RASV = Ruptured Aneurysm of Sinus of Valsalva, RCS
into RV

수술소견 및 결과

Table 2. Origin and cardiac chamber exit of the ruptured aneurysm

Origin	Cardiac chamber exit			Number of patients
	RV	RA	LV	
Right coronary sinus	13 (76.5%)	2 (11.7%)	1 (5.8%)	16 (94.1%)
Noncoronary sinus	0 (0.0%)	1 (5.8%)	0 (0.0%)	1 (5.8%)
Left coronary sinus	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)
Total	13 (76.5%)	3 (17.6%)	1 (5.8%)	17 (100%)

RV = Right Ventricle ; RA = Right Atrium ; LV = left Ventricle

Table 3. Associated cardiovascular lesions

Associated lesion	No of patients (%)
Ventricular septal defect	13 (76.5)
Subarterial	8 (47.0)
Perimembranous	5 (29.4)
Aortic regurgitation	5 (29.4)
Mild	2 (11.7)
Moderate	1 (5.8)
Severe	2 (11.7)
Tricuspid regurgitation	1 (5.8)
Pulmonary stenosis	1 (5.8)
RVOT obstruction	2 (11.7)
Infective endocarditis	1 (5.8)
PFO	1 (5.8)

RVOT = Right Ventricular Outflow Tract
PFO = Patent Foramen Ovale

가 3 (17.6%), 13 (76.5%), 1 (5.8%) (Table 2).

13 (76.5%) dacron
5 (29.4%) 2 (11.7%)
1 (5.8%)
2 (11.7%) 1 (5.8%)
1 (5.8%)

2 , 1 , 1
(Table 3).

16 NYHA class I

1 3
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1840 Thurnham 2) 1957 Li -
Ilehei 3) 가 4-6)
0.31 3.5%
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15)16) 가 1.4
33.2 ± 15.2
17)18)
1)19) His 20)
21)
가 1)
Nowicki
가 45.6%

Hwang³⁶⁾ 가 ,¹⁴⁾
 ,⁴³⁾
 45 가 ,
 (dehiscence),
 70 ,
 15 ,⁴⁴⁾
 13 가 2 1 3 16
 17 2 가 23.6±31.1
 2 3 3.5%²⁾¹¹⁾¹²⁾
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 11 streptococcal viri -
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요 약

연구배경 :

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 . 1990 방 법 :
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 15.2)
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 24) 1 결 과 :
 1) (64.7%), (11.7%),
 (11.7%), (5.8%), (5.8%)

(23.5%) (52.9%)
 (11.7%) (23.5%)
 2) (5.8%)
 13
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 3) 가 16 (94.1%)
 , 13 (76.5%) 2 (11.7%)
 1 (5.8%) . 1 (5.8%)
 4) 13 (76.5%),
 5 (29.4%),
 2 (11.7%), 1 (5.8%),
 1 (5.8%), 1 (5.8%),
 1 (5.8%)
 5) 1
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결 론 :

중심 단어 :

REFERENCES

- 1) Edward JE, Burchell HB. *The pathological anatomy of deficiencies between the aortic root and the heart, including aortic sinus aneurysms. Thorax* 1957;12:125-32.
- 2) Thurman J. *On aneurysms and especially spontaneous aneurysm of the ascending aorta and sinus of Valsalva. Med Chir Trans* 1840;23:323.
- 3) Lillehei CW, Stanley P, Varco RL. *Surgical treatment of ruptured aneurysms of the sinus of Valsalva. Ann Surg* 1957;146:459-72.
- 4) Kim SG, Shin HG, Lee SW, Kwon YJ, Roh JK, Lee KR. *Clinical observation on ruptured aortic sinus of Valsalva. Korean Circ J* 1985;15:311-8.
- 5) Joo SJ, Koh KG, Kim YH, Park YB, Choi YS, Seo JD et al. *Clinical observation on ruptured aneurysm of the sinus of Valsalva. Korean Circ J* 1987;17:149-58.
- 6) Kim WC, Yoon JS, Kim CK, Cho KD, Wang YP, Kwack MS. *Surgical treatment of ruptured sinus of Valsalva aneurysm Korean J Thorac Cardiovasc Surg* 1996;29:1207-11.
- 7) Mayer J, Wukiasch DC, Hallman GL, Cooley DA. *Aneurysms and fistulas of the sinuses of Valsalva. Ann Thorac Surg* 1975;19:170-9.
- 8) Chu Sh, Hung CR, How SS, Chang H, Wang SS, Tsai CH et al. *Ruptured aneurysms of the sinus of Valsalva in oriental patients. J Thoracic Cardiovasc Surg* 1990;99:288-98.
- 9) Sakiyalak P, Sahasakul Y, Chaithiraphan S, Jootar P, Sriyoschart S, Prachuabmoh K. *Ruptured aneurysm of the sinus of Valsalva: Report of twenty-eight cases. J Med Assoc Thailand* 1986;69:249-300.
- 10) Sakakibara S, Konno S. *Congenital aneurysm of the sinus of Valsalva: Anatomy and classification. Am Heart J* 1962;63:405-24.
- 11) Van Son JA, Sim EK, Starr A. *Morphometric features of ruptured congenital sinus of Valsalva aneurysm: implication for surgical treatment. J Cardiovasc Surg* 1995;36:433-6.
- 12) Van Son JA, Danielson GK, Schaff HV, Orszulak TA, Edwards WD, Seward JB. *Long-term outcome of surgical repair of ruptured sinus of Valsalva aneurysm. Circulation* 1994;90(Suppl):II20-9.
- 13) Nowicki ER, Aberdeen E, Friedman S, Rushkind WJ. *Congenital left aortic sinus-left ventricle fistula and review of aortocardiac fistulas (Corrective review). Ann Thorac Surg* 1977;23:378-88.
- 14) Burakovsky VI, Podsolkov VP, Sabirow BN, Nasedkina MA, Alekian BG, Dvinyaninova NB. *Ruptured congenital aneurysms of the sinus of Valsalva. J Thorac Cardiovasc Surg* 1988;95:836-41.
- 15) Boutefeu JM, Moret PR, Hann C, Hauf E. *Aneurysms of the sinus of Valsalva. Am J Med* 1978;65:18-24.
- 16) Tanabe T, Yocota A, Sugie S. *Surgical treatment of aneurysms of the sinus of Valsalva. Ann Thorac Surg* 1979;27:133-6.
- 17) London SB, London RE. *Production of aortic regurgitation by unperforated aneurysm of the sinus of Valsalva. Circulation* 1961;24:1403-6.
- 18) Steinberg I, Finby N. *Clinical manifestations of the unperforated aortic sinus aneurysm. Circulation* 1956;14:115-24.
- 19) Eliot RS, Wolbrink A, Edwards JE. *Congenital aneurysm of the left aortic sinus. Circulation* 1963;28:951-6.
- 20) Fishbein MC, Obma R, Roberts WC. *Unruptured sinus of Valsalva aneurysm. Am J Cardiol* 1975;35:918-22.
- 21) Harpaphongse M, Ayudhya RK, Jugdutt B, Rossall RE. *Isolated unruptured sinus of Valsalva aneurysm producing right ventricular outflow obstruction. Cathet Cardiovasc Diagn* 1990;19:98-102.
- 22) Verghese M, Jairaj PS, Babuthaman C, Sukumar IP, John S. *Surgical treatment of ruptured aneurysm of the sinus*

- of Valsalva. *Ann Thorac Surg* 1986;41:284-6.
- 23) Abe T, Komatsu S. Surgical repair and long-term results in ruptured sinus of Valsalva aneurysm. *Ann Thorac Surg* 1980;46:520-5.
 - 24) Holman WL. Aneurysms of the sinuses of Valsalva. In: Sabiston DC Jr, Spender FC. *Surgery of the chest*. 6th ed. Philadelphia: Saunders Co;1995. p.1316-25.
 - 25) Jansen EW, Nauta IL, Lacquet LK. Ruptured aneurysms of the sinus Valsalvae. *Thorac Cardiovasc Surg* 1984;32:148-51.
 - 26) Kucukoglu K, Ural E, Mutlu H, Ural D, Sonmez B, Uner S. Ruptured aneurysm of the sinus of Valsalva into left ventricle: A case report and review of the literature. *J Am Soc Echocardiogr* 1997;10:862-5.
 - 27) Barragry TP, Ring WS, Moller JH, Lillehei CW. 15- to 30-year follow-up of patients undergoing repair of ruptured congenital aneurysms of the sinus of Valsalva. *Ann Thorac Surg* 1988;46:515-9.
 - 28) Chiang CW, Lin FC, Fang BR, Kuo CT, Lee YS, Chang CH. Doppler and two-dimensional echocardiographic features of sinus of Valsalva aneurysm. *Am Heart J* 1988;116:1283-8.
 - 29) Sahasaku Y, Panchavinin P, Chaithiraphan S, Sakiyalak P. Echocardiographic diagnosis of a ruptured aneurysm of the sinus of Valsalva: operation without catheterization in seven patients. *Br Heart J* 1990;64:195-8.
 - 30) Dev V, Goswami KC, Shrivastava S, Bahl VK, Saxena A. Echocardiographic diagnosis of the aneurysm of the sinus of Valsalva. *Am Heart J* 1993;126:930-6.
 - 31) Terdjman M, Bourdarias JP, Farcot JC, Gueret P, Dubourg O, Ferrier A, et al. Aneurysms of sinus of Valsalva. Two-dimensional echocardiographic diagnosis and recognition of rupture into the right heart cavities. *J Am Coll Cardiol* 1984;3:1227-35.
 - 32) Vered Z, Rath S, Benjamin P, Motro M, Nehfeld HN. Ruptured sinus of Valsalva: Demonstration by contrast echocardiography during cardiac catheterization. *Am Heart J* 1985;109:365-6.
 - 33) Dev V, Shrivastava S. Echocardiographic diagnosis of unruptured aneurysms of sinus of Valsalva dissecting it into interven-tricular septum. *Am J Cardiol* 1990;66:502-3.
 - 34) Gherasim L, Cinteza M, Mihaileanu S, Fotiade B, Popa IPD. M-mode echographic features of sinus of Valsalva aneurysm. *Am Heart J* 1984;108:183-6.
 - 35) Wang KY, Sutton MJ, Ho HY, Ting CH. Congenital sinus of Valsalva aneurysm. A multiplane transesophageal echocardiographic experience. *J Am Soc Echocardiogr* 1997;10:956-63.
 - 36) Hwang HK, Kim PG, Lee SH, Koh KK, Lee JW, Lee YT. Ventricular septal defect with ruptured aneurysm of sinus of Valsalva into right ventricle, Transesophageal echocardiographic demonstration. *Sejong Med J* 1990;7:131-3.
 - 37) Blackshear JL, Safford RE, Lane GE, Freeman WK, Schaff HV. Unruptured noncoronary sinus of Valsalva aneurysm: preoperative characterization by transesophageal echocardiography. *J Am Soc Echocardiogr* 1991;4:485-90.
 - 38) MacKenny PA, Schemin RJ, Wiegers SE. Role of transesophageal echocardiography in sinus of Valsalva aneurysm. *Am Heart J* 1992;123:228-9.
 - 39) Worthan DC, Gorman PD, Hull RW, Vernalis MN, Gaitner NS. Unruptured sinus of Valsalva aneurysm diagnosed by transesophageal echocardiography. *Am Heart J* 1992;124:896-8.
 - 40) Ho VB, Kinnev JB, Sahn DJ. Ruptured sinus of Valsalva aneurysm: cine phase-contrast MR characterization. *J Compu Assis Tomogr* 1995;196:52-6.
 - 41) Samaha FF, Lang R, Abbo KM, Carroll JD, Weinert L, Follman DF. Intracardiac ultrasonographic imaging to diagnose a ruptured sinus of Valsalva aneurysm. *Am Heart J* 1994;128:409-12.
 - 42) Wang XF, Li ZA, Cheng TO, Deng YB, Zheng LH, Hu G, et al. Clinical application of three-dimensional transesophageal echocardiography. *Am Heart J* 1994;128:380-8.
 - 43) Choudhary SK, Bhan A, Sharma R, Airan B, Kumar AS, Venugopal P. Sinus of Valsalva aneurysms: 20 years' experience. *J Card Surg* 1997;12:300-8.
 - 44) Au WK, Chiu SW, Mok CK, Lee WT, Cheung D, He GW. Repair of ruptured sinus of Valsalva aneurysm: Determinants of long-term survival. *Ann Thorac Surg* 1998;66:1604-10.