Small Ventricular Septal Defect: Long-Term Expectant Clinical Management

Edmar Atik
Dr. Edmar Atik's Private Practice, São Paulo, SP - Brazil

Summary

Background: **The small ventricular septal defect (VSD) usually presents good clinical evolution, even at long-term follow-up.**

Objective: **To verify the clinical evolution of patients with small VSD in order to determine the continuation or not of the expectant conduct, considering the low operative risk, which results in a more liberal indication for surgery.**

Methods: **From October 1976 to December 2007, 187 cases of small VSD (diameter < 3 mm at the echocardiogram) were evaluated and 155 of them were assessed at long-term follow-up. Time of the clinical manifestation of the murmur and evolution aspects such as the spontaneous closure of the defect (group I) - 64 cases, persistence of the initial size (group II – 74 cases and decrease in the size of the defect (group III) – 17 cases, in addition to clinical complications, were studied.**

Results: **The clinical manifestation of the murmur occurred, in the majority of cases, during the first month of life, corresponding to 48 (75%), 54 (72.9%) and 12 (70.5%) patients, in the three groups, respectively and after the first year of life in 11 (5.8%) patients. Spontaneous closure occurred in the first year of life in 48 cases (75%), mean of 7.6 months and from 1 to 5.5 years in 15 patients (23.4%), with a maximum follow-up of 18 years. The persistence of the defect until 40 years of age was observed. The decrease in the size of the defect occurred on a mean of 15 months, followed for up to 9 years. The probability of VSD closure by the actuarial curve was 34.38% in 1 year and 49.89% in 5 years. There were no clinical complications.**

Conclusion: **A favorable evolution of the small VSD at long-term follow-up does not require surgical intervention, with concerns regarding the strict antibiotic prophylaxis. (Arq Bras Cardiol 2009; 92(6) : 396-399)**

Key words: **Heart defects, congenital; ventricular septal defect; clinical evalution.**

Introduction

The best management for patients with small ventricular septal defect (VSD) is currently a matter of debate. The expectant clinical management is usually contrasted with the surgical repair. Due to the currently available resources, which result in low surgical risk and good postoperative evolution, there is a tendency to perform the surgical repair, as it can prevent the occurrence of infectious endocarditis. However, many times the surgical repair is carried out during evolution periods, in which the spontaneous closure can still happen naturally. Therefore, we propose this evolution study, through the long-term review of the expectant clinical management, which is accepted as the norm and can better dictate the conduct considered to be the most adequate one[1-5].

Mailing address: Edmar Atik •
Rua D. Adma Jafet, 74 cj. 73 – 01308-050 – São Paulo, SP - Brazil
E-mail: conatik@incor.usp.br, eatik@cardiol.br
Manuscript received May 30, 2008; revised manuscript received June 24, 2008; accepted August 19, 2008.

Material

The medical files of patients with small ventricular septal defect (diameter < 3 mm) were retrospectively assessed, from October 1976 to December 2007, referred to a private clinic for assessment and posterior conduct. This group, consisting of 187 patients (57.5%) was discriminated from the one with moderate VSD (diameter of 4 to 6 mm), consisting of 107 patients (32.9%), as well as from those with large VSD (diameter > 7 mm), with 31 patients (9.5%).

Methods

We studied, only in the group of patients with small VSD, the age at the clinical manifestation of the heart murmur (single clinical sign diagnostic of the defect) and the evolution aspect of the defect regarding spontaneous closure (group I), which occurred in 64 cases, the unaltered persistence of the initial size (group II) in 74 cases and the decrease in the size of the defect (group III) in 17 cases, totaling 155 cases. Thus, of the total number of 187 cases of small VSD, 32 patients were excluded from the evolution analysis (17.1% of the cases with small VSD), as they were not followed after the first visit. In

each group analyzed regarding the evolution, the age at the time of the anatomical alteration or persistence was sought to be established, as well as evolution complications, up to the last clinical assessment that was carried out.

The rate of VSD closure was estimated by the calculation of the actuarial curve of Kaplan-Meier, with a 95% confidence interval.

Results

All patients remained asymptomatic since the initial assessment. The systolic murmur initially corresponded, in the 187 patients, to + intensity in 47 cases (25%), +/++ in 104 cases (56%) and ++ in 36 cases (19%). Systolic thrill was present exclusively in 11 of the 36 patients with higher murmur intensity. As for the murmur location, it was present exclusively at the left sternal border in 123 cases (65.7%), irradiating to the right sternal border in 34 cases (18.1%), irradiating to the right sternal border and mitral area in 17 cases (9.1%) and irradiating to the mitral area in 13 cases (6.95%). As for the location of the VSD in the ventricular septum, it was muscular trabecular in 119 cases (63.6%) and in a perimembranous region in 68 cases (36.3%). In the three evolution groups, defect closure (group I – 64 cases) (table 1), defect maintenance (group II – 74 cases) (table 2) and decrease in size of the defect (group III – 17 cases) (table 3), we observed that the clinical manifestation of the murmur occurred mainly in the neonatal period in 48 (75%), 54 (72.9%) and 12 (70.5%) patients, respectively, at a mean age of 8.3, 8.6 and 18.8 days in the three groups. The manifestation of the murmur during the first year of life, excluding the neonatal period, occurred in 13 (20.3%), 12 (16.2%) and 5 (29.4%) cases in the three groups, at a mean age of 81 days, 142 days and 4 months, respectively. After the first year of life, the manifestation of the murmur occurred in 3 (4.6%) and 8 (10.8%) cases in the two first groups, at mean ages of 42.3 and 43.5 months.

The spontaneous closure of the defect occurred at a mean age of 7.6 months, 26 months and 61.6 months, respectively, in those with neonatal manifestation, during the first year and after the first year of life (table 1). It is noteworthy that the spontaneous closure of the defect occurred in 15 patients (23.4% of the total) after the first year of life. Regarding the location of the VSD in the ventricular septum, the spontaneous closure of the 64 cases occurred in 40 (62.5%) patients among those in the trabecular muscular region and in 24 (37.5%) patients among those in the perimembranous region. The decrease in size of the defect occurred on a mean of 15 months and 41.6 months in comparison to the two first age groups (tab. 3). Among those that presented evolution with defect maintenance, there was a follow-up up to a mean age of 8.29 years (1 month to 40 years), among those with neonatal manifestation; the follow-up was carried out up to a mean of 37.7 months (4 months to 14 years); among those with manifestation during the first year of life; the follow-up was carried out up to a mean of 84 months (4 to 15 years) among those with manifestation after the first year of life (table 2). In group I, the long-term follow-up was carried out in 23

Table 1 – Aspects of the spontaneous closure of the small VSD related to the time of murmur manifestation and long-term clinical review.

Murmur manifestation		Spontaneous closure	Long-term review
N.	48	48*	23
< 1 month			
Mean	8.3 d	7.6 m	59.4 m (3 m-18 yrs)
N.	13	13**	5
1-7 months			
Mean	81 d	26 m	103.8 m(15 m-18 yrs)
N.	3	3***	3
2 to 9 m – 5 yrs			
Mean	42.3 m	61.6 m	99 m(6-9 to 9 m)

*d – days; m – months; yrs - years; * > 1 yr: 7 (M: 26.4 m (1-5 yrs)); ** > 1 yr: 5 (M: 24.8 m (1-4 yrs)); *** > 1 yr: 3 (M: 61.6 m (4 to 11 m-5 to 6 m)); 15 (23.4%)*

Table 2 – Aspects of small VSD continuity related to the time of the manifestation of the murmur and long-term clinical review

Murmur externalization		Long-term clinical review
N.	54	54
< 1 month		
Mean	8.6 d	8.2 to (1 m – 410 yrs)
N.	12	12
1-12 months	142 d	37.7 m (4 m – 14 yrs)
N.	8	8
2 to 6 yrs		
Mean	43.5 m	84 m (4yrs-15yrs)

d – days; m – months; yrs - years

Table 3 – Aspects of the spontaneous decrease of the small VSD related to the time of the murmur manifestation and long-term clinical review.

Murmur externalization		Spontaneous decrease	Long-term review
N.	12	12	10
< 1 month			
Mean	18.8 d	15 m	45.2 m (1.8 yrs-3.7yrs)
N.	5	5	5
3-5 months			
Mean	4m	41.6 m (2-9 yrs)	41.6 m (2-9 yrs)

d – days; m – months; yrs - years

patients of the 48 with neonatal manifestation throughout an evolution mean of 59.4 months (3 months to 18 years), in 5 of the 13 after the first month up to a mean of 103.8 months (15 months to 18 years) and in 3 cases older than 1 year, with a mean of 99 months (6 to 9.9 years). The actuarial curve, regarding the closure of the VSD, shows a higher probability of occurrence during the first year of life, continuing, however, up to 5 years, corresponding to a mean up to this age of 49.89% of the total, with a confidence interval between 40 and 60% (Chart 1). The probability of VSD closure, sequentially, was estimated as 34.38% in the first year, 41.19% with 2 years, 43.59% with 3 years, 45.04% with 4 years and 49.89% with 5 years. None of the patients presented a clinical picture of infectious endocarditis and the surgical intervention was not considered, even in those patients with a later evolution up to the adult age, due to the absence of adverse outcomes.

Discussion

The evolution of the small VSD has always been regarded as favorable, considering the possibility that the spontaneous closure will occur mainly during the first year of life. There is evidence that this spontaneous closure occurs more frequently in muscular VSD cases when compared to the perimembranous VSD, as demonstrated by Mehta and Chidambaram[1] at percentages of 42% and 23%, respectively, in these two locations. The same relation, at even higher proportions than the aforementioned one, was demonstrated by Miyake et al[2], corresponding, respectively, to 83% in the cases with muscular VSD and to 45% in those with perimembranous VSD. Moe and Guntheroth[3] also demonstrated this closure in 50% of the muscular VSD and in 37% of the perimembranous ones. Other authors were also in accordance with this and thus, Lin et al[4] verified closure of the defect in 83% of the muscular VSD and 24% of the perimembranous ones. In this context, it is also noteworthy to observe the spontaneous closure of small residual ventricular septal defect, smaller than 2 mm, even after the surgical repair, as demonstrated in 83% of these cases in the first year after the surgery[6]. This fact is worth mentioning considering the unnecessary concern also in this group of patients that have undergone surgery. Considering the currently available surgical resources, one can forget that this closure can occur spontaneously after the first year, as it happened in 24.5% of our cases. According to the assessment by the actuarial curve, 49.89% of our cases with small VSD achieve spontaneous closure up to 5 years, in comparison to 34.38% in the first year.

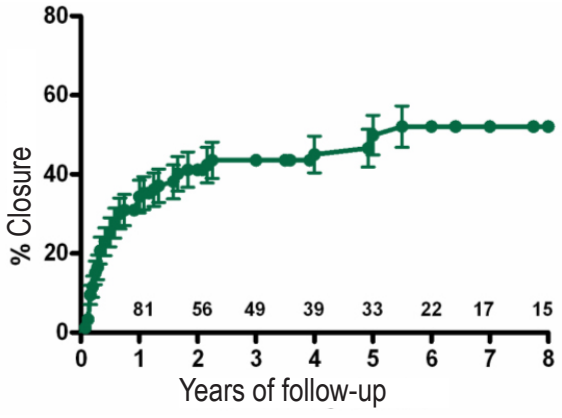

Chart 1 - Closure of small VSD in 155 studied patients, during 8 years of clinical follow-up (values expressed as means ±SE. The numbers indicate the patients undergoing follow-up in each period).

In this context, Mehta and Chidambaram[1] also verified the spontaneous closure in 67% of the patients followed up to 5 years, as well as Gabriel et al[5] who observed it in 6% of cases at adult age among patients with VSD that had not undergone surgery with long-term follow-up. Therefore, these results lead to the necessary and cautious continuation of the clinical observation, even in cases with VSD evaluated after the first year of life. In support of this consideration is the fact that infectious processes were not observed in our group of patients, as the guidelines of adequate infectious prophylaxis were followed, mainly during dental treatment.

The slight outcome that persists in these patients, even during long-term evolution up to ages older than the fourth decade of life, also leads to the continuation of the expectant conduct, albeit careful. This favorable evolution was also demonstrated by Gabriel et al[5] when following 222 patients at a mean age of 30+10 years, verified that the left ventricular cavity remained normal in 89% of the cases, within the normal range in 23%, and only one patient showed a slightly increased left ventricular size. The infectious endocarditis as a potential evolution risk in these patients occurs, according to estimates[5], in 0.1 in each 1,000 pts/year, and undoubtedly constitutes a point to be considered for the surgical indication in these cases, mainly when the patient belongs to a lower socioeconomic class. Otherwise, the expectant conduct may be the most recommended one for the control of infection, mainly by the use of adequate prophylaxis. Such directive, unquestionably, must prevail as the norm throughout the first year of life for patients with small VSD, with the surgical intervention being precipitated and unnecessary during this period. The stringency of this strategy is due to the evident and frequent spontaneous closure of the defect during this age range.

The favorable long-term evolution of these patients implies in regular medical evaluations with the objective of preventing emotional discomfort and unreasonable concerns that can eventually occur in the involved families.

Briefly, in the ventricular septal defect, there must be a medical concern regarding the establishment of intervention conducts, through surgery or even cardiac catheterism, in cases that really present adverse outcomes that can interfere with the natural longevity.

The same applies to other abnormalities with mild outcomes, such as pulmonary and aortic stenoses, interatrial communication and ductus arteriosus, among others.

Acknowledgement

To Prof. Dr. Luiz Felipe P. Moreira, Professor of Thoracic and

Cardiovascular Surgery from FMUSP, by promptly designing the actuarial chart of this article.

Potential Conflict of Interest

No potential conflict of interest relevant to this article was reported.

Sources of Funding

There were no external funding sources for this study.

Study Association

This study is not associated with any post-graduation program.

References

1. Mehta AV, Chidambaram B. Ventricular septal defect in the first year of life. Am J Cardiol. 1992; 70: 364-6.
2. Miyake T, Shinohara T, Nakamura Y, Fukuda T, Tasato H, Toyohara K, et al. Spontaneous closure of ventricular septal defects followed up from < 3 months of age. Pediatr Int. 2004; 46: 135-40.
3. Moe DG, Guntheroth WG. Spontaneous closure of uncomplicated ventricular septal defect. Am J Cardiol. 1987; 60: 674-8.
4. Lin MH, Wang NK, Hung KL, Shen CT. Spontaneous closure of ventricular septal defects in the first year of life. J Formos Med Assoc. 2001; 100: 539-42.
5. Gabriel HM, Heger M, Innerhofer P, Zehetgruber M, Mundigler G, Wimmer M, et al. Long-term outcome of patients with ventricular septal defect considered not to require surgical closure during childhood. J Am Coll Cardiol. 2002; 39: 1066-71.
6. Dodge-Khatami A, Knirsch W, Tomaske M, Prêtre R, Bettex D, Rousson V, et al. Spontaneous closure of small residual ventricular septal defects after surgical repair. Ann Thorac Surg. 2007; 83: 902-5.