



Outcomes of congenital coronary artery fistula at Children's Hospital 2

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General Note



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ABSTRACT

Objective: To evaluate the outcomes of congenital coronary artery fistula by cardiac catheterization at Children's Hospital 2. **Object and method:** The study of describing a series of 20 cases of coronary artery fistula diagnosed by echocardiography, coronary catheterization, and intervention of coronary artery fistula blockage by cutaneous at Children's Hospital 2, Ho Chi Minh City from 4/2010 – 9/2019. **Results:** Existent fistula after one month accounts for 45%, after one year of 15%. Cardiac catheterization in children is an effective treatment with a high success rate. Long-term progress monitoring has good results.

Keywords: Cardiac catheterization, congenital coronary artery fistula.

1. INTRODUCTION

Coronary artery fistula is a condition in which the coronary artery is connected to the heart chamber or into large blood vessels near the heart, such as the coronary sinuses, pulmonary artery, or superior vena cava without entering the coronary capillary bed of the heart muscle. The causes of coronary artery fistula are mostly congenital. A very rare number is acquired after cardiac surgery, trauma, after pacemaker, cardiac muscle biopsy, or after coronary angiography (Lim et al., 2014; Reddy et al., 2015). Coronary artery

fistula is a rare disease that requires treatment, previously mostly surgery. Surgery is also difficult due to the characteristics of complicated fistulas, multiple holes in coronary artery fistula, aneurysms, especially more difficult surgery in the newborn period. Surgical results also have many complications, such as myocardial infarction, coronary thrombosis, residual fistulas (Mangukia, 2012). Recently with the advancement of cardiac catheterization and experience of intravascular intervention, the method of holes in coronary artery fistula seal by cardiac catheterization has become the method of choice. There are many techniques for coronary angioplasty to be performed, closed by metal coil, with closing umbrella devices atrial septal defect, even with closing umbrella devices septal ventricular septal, generation I, II angioplasty (Holmes et al., 2013). This study aims to evaluate the outcomes of congenital coronary artery fistula by cardiac catheterization at Children's Hospital 2.

2. MATERIALS AND METHODS

All patients with congenital coronary artery fistula were diagnosed and / or intervened, in accordance with the sample selection criteria at 2 Children's Hospital. Ho Chi Minh City from 4/2010 - 9/2019, including 20 patients. Excluding cases: Patients abandoning re-examination, incomplete and missing medical records. Tune the coronary artery into the heart chamber right in the pathology without valve pulmonary septal artery, closed ventricular wall. The left coronary artery comes from the pulmonary artery. Research targets: Physical examination, X-ray, ECG, echocardiography were performed after closing congenital coronary artery fistula. Evaluation: instrument placement, residual shunt, coronary size, thrombosis, arrhythmia, myocardial ischemia, pulmonary artery pressure, cardiac function. Re-examination after 1, 3, 6, 12 months, and every year after. The collected data was entered and processed using SPSS 22.0 biomedical statistical software.

3. RESULTS

Table 1 presents the cardiac catheterization sealing of holes in coronary artery fistula test results. The pulmonary artery pressure behind the holes in coronary artery fistula with an umbrella device was 30.70 ± 11.30 mmHg. Time for resuscitation was 89.2 ± 58.9 mins and the hospital stay was 3.6 ± 2.6 days. Table 2 show the outcomes of patients after closing coronary artery fistula.

Table 1 Cardiac catheterization sealing of holes in coronary artery fistula test results

Characteristics	Mean $\pm$ SD
The pulmonary artery pressure behind the holes in coronary artery fistula with an umbrella device (n=20)	30.70 ± 11.30 mmHg
Time for resuscitation (n=13)	89.2 ± 58.9 mins
Time in hospital (n=20)	3.6 ± 2.6 days

Table 2 Monitor patients after closing coronary artery fistula

Characteristics	0 (n=20)	1 month (n=20)	3 month (n=20)	6 month (n=20)	1 year (n=20)	Present (n=20)
Residual hole in coronary artery fistula n(%)						
No	8(40.0)	11(55.0)	14(70.0)	15(75.0)	17(85.0)	17(85.0)
Little residual hole in coronary artery fistula	12(60.0)	9(45.0)	6(30.0)	5(25.0)	3(15.0)	3(15.0)
Ejection Fraction (%)	71.8 ± 5.0	72.8 ± 5.4	73.4 ± 4.6	73.7 ± 4.6	73.8 ± 4.7	74.1 ± 4.1
Pulmonary artery pressure (mmHg)	29.3 ± 8.0	28.1 ± 7.0	26.2 ± 4.7	26.1 ± 7.4	25.8 ± 8.9	23.4 ± 2.8
Pericardial hemorrhage n(%)	1(5.0)	0(0.0)	0(0.0)	0(0.0)	0(0.0)	0(0.0)
Coronary artery dilatation n(%)	5(25.0)	4(20.0)	4(20.0)	4(20.0)	4(20.0)	4(20.0)
Atrial septal defect n(%)	1(5.0)	1(5.0)	1(5.0)	1(5.0)	1(5.0)	0(0.0)
Oval hole n(%)	1(5.0)	1(5.0)	1(5.0)	1(5.0)	1(5.0)	1(5.0)
Stent RVOT n(%)	1(5.0)	1(5.0)	1(5.0)	1(5.0)	0(0.0)	0(0.0)
Closingumbrella devices PDA n(%)	1(5.0)	0(0.0)	0(0.0)	0(0.0)	0(0.0)	0(0.0)

4. DISCUSSION

The pulmonary artery pressure after the coronary artery also has average values within the allowable limit (30.70 ± 11.30 mmHg). There are 14 cases with resuscitation, including 13 cases with the average duration of resuscitation 89.2 ± 58.9 minutes, the shortest is 30 minutes, and the longest is 240 minutes, and there is 01 case due to pricing. Right ventricular chamber support should be resuscitated for two days. All patients were hospitalized, the average length of hospital stay after cardiac catheterization was 3.6 ± 2.6 days, the shortest was one day, and the maximum was 12 days.

In our study, there was 1 case of pericardial hemorrhage (5%) in the first 36 hours, requiring emergency surgery. In this patient, the large opening closed the hole in the opposite direction with the device close ventricular septal no.8, complications of pericardial hemorrhage causing cardiac tamponade. No cases of drifting, no cases of heart attack complications. After one month, 45% of cases still had coronary artery fistulas with a low level (9 cases). When tracking the progress, there was 1 case that only monitored one month, 2 cases monitored within one year, 17 cases over one year. After one year of residual coronary artery fistulas decreased to 15%. Among our patients who were monitored after the cardiac intervention, closed coronary artery fistulas, 45% of patients had 1-month residual shunts (9 cases). When tracking the progress, there was one case that only monitored one month, 2 cases monitoring within one year, 17 cases monitoring over one year. After one year of residual coronary artery fistulas decreased to 15%, there were no cases that needed intervention.

According to the report of Ponthier et al, after ten years of monitoring coronary intervention, 31% of coronary arteries left after a cardiac catheterization, and 50% left after coronary artery fistulas after surgery. After six years of monitoring, the rate of coronary artery bypass retention in children requiring intervention is only 37.5% of adults (Ponthier et al., 2015). According to the author, detection of coronary artery detection late often progresses into complex fistulas, after intervention complicated coronary detective bits, the rate of residual detecting or forming a new hole has a higher rate. This supports the idea that intervention should be made in the early closure of coronary artery fistulas, and there is a plan for long-term follow-up of the status of the fistulas. The rate of coronary artery fistulas stored after cardiac catheterization is different for each report, depending on the method and method of choosing a bypass device. According to Shen et al. the rate of residual detection is 30%, of which the required intervention rate is 1% (Shen et al., 2019). According to the report of Yun et al. among 12 cases of cardiac catheterization closed coronary artery fistulas, up to 3 cases have significant residual fistulas after blocking the fistula line with a vein stopper and re-intervention (Yun et al., 2018).

In our study, the rate of residual fistula after one year was 15%, and there were no cases that required cardiac catheterization. The reason why our residual fistula rate is low maybe because we mainly use through generation II, although closed ventricular septal defect and atrial septal closure, the structure of generation II parachute consists of folded nitinol fibers into multiple layers (2 wings and body). The instrument closes the ventricular septal defect, and although the atrial septal closure is in addition to the nitinol fiber, there is a polyester fiber in between that helps seal the fistula. While 3 cases of residual fistulas needed to intervene, according to Yi Fan Li's report, all coronary artery detectors closed with vascular plugs, because the structure of the vascular closure consists only of nitinol fibers woven into one layer, so the ability fistulas are lower than Generation II parachutes, whether with an atrial septal defect or ventricular septal closure device.

Although the fistula rate remained in our study is 15%, when followed long-term follow-up without serious complications occurred, all patients were stable. This is similar to the report by Ponthier and et al. Although residual fistula and recurrent fistula was high 31%, there were no serious complications after ten years of follow up (Ponthier et al., 2015). Performing coronary angiography 21 patients after coronary artery column surgery saw that "native" coronary branches continued to develop zigzag dilatation, thrombosis often formed near the location of the fistula line, the branches near the place. complete obstruction (4 cases), thrombosis near the coronary artery and distal part supplied by bladder blood vessels (2 cases). One case after closure, even though the ductus arteriosus was equal to the generation I 8×6 umbrella device, after 24 hours of checking to see whether the ductus arteriosus was still in place, detecting and detecting the right coronary artery into the left atrium. The patient underwent coronary artery bypass catheterization with the generation II parachute.

There was 1 case of intervention in the newborn period (5%). The patient suffered from Fallot's quadrilateral and large coronary artery fistulas, clinically severe violet. Interventional cardiac catheterization intervention and placement of emergency right ventricular chamber support. After 12 months, the patient underwent radical surgery for Fallot's quadrature and removed all remaining shunts. One case of pericardial hemorrhage required emergency surgical intervention for pericardial drainage (5%), after 12 months of ultrasound examination detected coronary aneurysms right on the ventricular septal closure device friends. Clinically painless chest, normal ECG, Troponin I within normal limits, patients undergoing coronary catheterization to check for coronary artery thromboembolism, coronary arteries appear many cardiac muscle collateral. Patients continue to monitor and treat with acenocoumarol.

One case (5%) had recently probed coronary artery and atrial septal defect, after the closure of coronary artery fistulas, at three years of age closed atrial septal defect with a device. Three cases of small coronary arteries did not cause hemodynamic disorders, on the echocardiogram of normal heart size, the flow through the fistula was insignificant, so it was continued to follow up the re-examination. Ejection fraction over time of monitoring did not change much, ranging between 72.8% - 74.1%, and the difference was not statistically significant ($p > 0.05$). The pulmonary arterial pressure during monitoring is also reported to be within the normal range, and when monitoring to the present (2019), PAPs are at 23.4 ± 2.8 mmHg. It is noted that up to 20% of cases of coronary vasodilation after caustic coronary fistulas, this condition has gradually decreased in size, but is still stretching to the present time.

5. CONCLUSION

Detecting the balance after one month accounts for 45%, after one year 15%. Congenital cardiac catheterization in children is an effective treatment with a high success rate. Long-term progress monitoring has good results.

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Conflicts of Interest: The authors declare no conflict of interest.

Informed consent

Informed consent was obtained from all individual participants included in the study. Additional informed consent was obtained from all individual participants for whom identifying information is included in this manuscript.

Ethical approval for study protocol

The study was approved by the Medical Ethics Committee of Children Hospital 2 (ethical approval code: 022010-CH2).

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