International Journal of Medical Science and Clinical Research Studies

ISSN(print): 2767-8326, ISSN(online): 2767-8342

Volume 04 Issue 08 August 2024

Page No: 1596-1598

DOI: https://doi.org/10.47191/ijmscrs/v4-i08-31, Impact Factor: 7.949

Percutaneous Closure of Type IV Aortopulmonary Window. An Illustrative Case

Francisco Javier Robles-Ortiz[1], Ricardo Frausto-Luján[2], Gustavo Manuel Sánchez Ureña[3], Elliot Valle Rodriguez[4], Hugo Elorreaga Camacho[5], Luis Enrique Godínez Muñoz[6]

[1,2,4,5,6]Cardiology Department, Instituto de Seguridad y Servicios Sociales de los Trabajadores del Estado, Hospital Regional "Dr. Valentín Gómez Farías", Zapopan, Jalisco

[3]Pediatric Interventional Cardiology Department, Instituto de Seguridad y Servicios Sociales de los Trabajadores del Estado, Hospital Regional "Dr. Valentín Gómez Farías", Zapopan, Jalisco.

ABSTRACT

The aortic-pulmonary window is a rare congenital heart defect characterized by a direct communication between the aorta and pulmonary artery, bypassing the normal route through the heart. This defect can lead to significant hemodynamic changes, including increased pulmonary blood flow and volume overload. Symptoms often manifest in infancy or early childhood and can range from mild to severe, depending on the size of the defect and associated cardiac anomalies. Percutaneous treatment of the aortic-pulmonary window represents a promising advancement in the management of this complex congenital defect. While surgical repair remains a viable option for some cases, percutaneous methods provide a less invasive alternative with favorable outcomes. Continued research and technological improvements are essential for optimizing treatment strategies and improving patient quality of life.

KEYWORDS: Aortopulmonary window, congenital heart defect, percutaneous closure, minimally invasive surgery, catheter-based intervention.

ARTICLE DETAILS

Published On:
31 August 2024

Available on:
https://ijmscr.org/

I. INTRODUCTION

The aortopulmonary window is a congenital defect, which consists of a communication between the main pulmonary artery and the ascending aorta in the presence of two separate semilunar valves, which differentiates it from truncus arteriosus. This occurs during early embryogenesis, due to incomplete separation of the wall of the main pulmonary artery and the aorta in the conotruncal septum.

The incidence of this congenital heart disease is equivalent to 0.1% of all congenital heart diseases, which makes it a very rare entity. It can be classified as follows: type I is a proximal defect with a very small inferior aortopulmonary septum above the semilunar valves; type II consists of distal defects located in the superior portion of the ascending aorta with no superior septum; type III defects are large that extend from the semilunar valves to the bifurcation of the pulmonary artery; and type IV is the intermediate type that has a central defect with adequate superior and inferior borders.

Historically, treatment of the aortopulmonary window was exclusively surgical, involving resection of the anomalous tissue and restoration of normal anatomy. However, in recent years, percutaneous closure techniques have been developed that have proven to be effective and less invasive. This approach involves the use of occlusion devices that are placed through catheters, which reduces the recovery time and complications associated with open surgery.

II. CASE REPORT

We present an 11-month-old male patient with a diagnosis of type IV aortopulmonary window, with low weight for age, who underwent to a percutaneous intervention for the clousure of a congenital defect. Under full sedation, asepsis and antisepsis were performed as well as femoral vein and artery puncture, during aortography it can be seen aortopulmonary window type IV defect with dimensions of 10 mm X 5 mm of ovoid shape with proximity to valvular plane of 7 mm. By anterograde route, a 10 mm double septal

disc device is ascended, observing obstruction of the ascending aorta with significant gradients, so it is changed to an 8 mm persistent ductus arteriosus occluder device with a 13 mm retention disc, which is successfully placed.

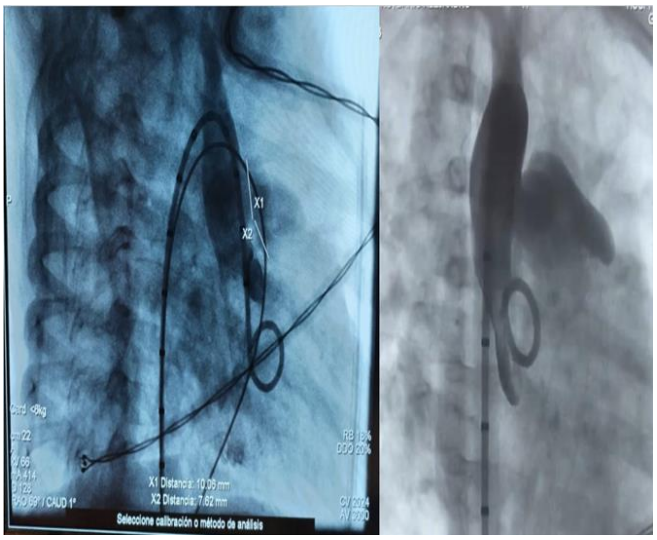

Figure 1 . Invasive angiography in which aortopulmonary window type IV is observed.

III. RESULTS

A transthoracic echocardiogram was performed in which no device leaks nor aortic or pulmonary obstruction were observed.

The patient was asymptomatic and was discharged 24 hours after the procedure. At 1 month and 2 months after the procedure, the patient was asymptomatic, with weight gain, which is already in normal values for height, age and sex, with control transthoracic echocardiogram, without appreciating device leaks, with preserved ventricular function and normal sized cavities.

IV. DISCUSSION

. Surgical Procedure: Surgical repair of the VAP involves direct correction of the defect through open surgery. A thoracotomy is usually performed to access the heart and the defect. The repair is performed using patches of synthetic or autologous material to close the abnormal communication between the aorta and the pulmonary artery.

Advantages of Surgical Treatment, Efficacy: Open surgery has long been the standard of care and has proven to be highly effective in correcting the defect, with success rates exceeding 90%. Surgical repair allows direct and durable anatomical correction of the defect. Direct Control: Allows direct evaluation of the defect and adjacent structures, which can be crucial in complex cases. Disadvantages of Surgical Treatment, Invasiveness: Open surgery is highly invasive, requiring a significant thoracic incision and prolonged postoperative recovery. This can lead to complications such as infection, postoperative pain and a longer hospital stay.

Percutaneous Procedure: Percutaneous treatment of VAP is performed using minimally invasive techniques, usually through femoral access. Closure devices such as Amplatzer devices are used to occlude the defect. The procedure is guided by echocardiographic and fluoroscopic imaging to ensure proper device placement. Advantages of Percutaneous Treatment: Less Invasive: The percutaneous approach is significantly less invasive than open surgery. It is usually performed under local anesthesia and sedation, with a faster recovery and shorter hospital stay. Rapid Recovery: Patients usually experience less postoperative pain and a faster recovery, which can translate into reduced rehabilitation time and a lower rate of postoperative complications. Disadvantages of Percutaneous Treatment:

Patient Selection: Not all patients are suitable for percutaneous closure. The feasibility of the procedure depends on the anatomy of the defect and the size of the defect. Large defects or defects with complex anatomic features may not be suitable for percutaneous closure.

Technical Complications: Complications may include device embolization, vascular perforation, and arrhythmias.

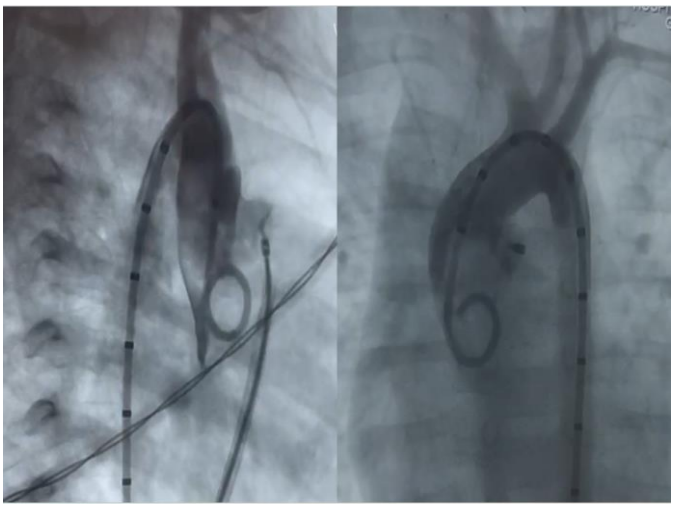

Figure 2. Outcome after successful occlusion device placement

V. CONCLUSION

Percutaneous aortopulmonary window closure is a valid option with gratifying results in patients adequately assessed for the same procedure, in which it is of crucial importance to classify the type of defect, assess defect borders, size and proximity to the valvular plane.

This with its respective complications, mainly embolization of the device and persistent shunt, mainly related to an inadequate size of the occluder with respect to the defect.

The option of percutaneous closure of the aortopulmonary window should be offered in experienced centers to the adequate patients for it as the first option for closure of the congenital defect.

ACKNOWLEDGMENT

We would like to thank Dr. Gustavo Manuel Sanchez Urena for allowing us to be in the procedure and follow up of the above mentioned case.

REFERENCES

I. L.M. Kutsche, L.H.S. Van Mierop. Anatomy And Pathogenesis Of Aorticopulmonary Septal Defect. Amj Cardiol., 59 (1987), Pp. 443-447

II. Aldo Campos-Quintero, Transcatheter Device Closure Of Aortopulmonary Window. Is There A Need For An Alternative Strategy To Surgery? Doi.Org/10.1016/J.Recesp.2018.03.012

III. Stamato T, Benson L, Smallhorn J, Freedom R. Transcatheter Closure Of An Aortopulmonary Window With A Modified Double Umbrella Occluder System. Cathet Cardiovasc Diagn. 1995;35:165–167.

IV. Van Praagh R. Van Praagh S. The Anatomy Of Common Aorticopulmonary Trunk (Truncus Orteriosus Communis] And Its Embryologic Implications. A Study Of 57 Necropsy Cases. Am I Cardiol 1965;16:406-425.

V. Bain CWC. Parkinson J. Common Aorto-Pulmonary Trunk: O Rare Congenital Defect. Br Heart J 1943;5:97-100.

VI. Trehan V, Nigam A, Tyagi S. Percutaneous Closure Of Nonrestrictive Aortopulmonary Window In Three Infants. Cathet Cardiovasc Interven. 2008;71:405–441.

VII. Richens T, Wilson N. Amplatzer Device Closure Of A Residual Aortopulmonary Window. Cathet Cardiovasc Interven. 2000;50:431–433.

VIII. Naik G, Chandra S, Shenoy A, Et Al. Transcatheter Closure Of Aortopulmonary Window Using Amplatzer Device. Cathet Cardiovasc Interven. 2003;59:402–405.

IX. Mori K, Ando M, Takao A, Ishikawa S, Imai Y. Distal Type Of Aortopulmonary Window: Report Of 4 Cases. Br Heart J. 1978;40:681–689.

X. Becker AE, Anderson RH, Eds. Pathology Of Congential Heart Disease. Woburn, MA: Butterworths, 1961:345-347.

XI. Tulloh RM, Rigby ML. Transcatheter Umbrella Closure Of Aortopulmonary Window. Heart 1997;77:479–480.

XII. Jureidini SB, Spadaro JJ, Rao PS. Successful Transcatheter Closure With The Buttoned Device Of Aortopulmonary Window In An Adult. Am J Cardiol 1998;81:371–372.

XIII. .Atiq M, Rashid N, Kazmi KA, Qureshi SA. Closure Of Aortopulmonary Window With Amplatzer Duct Occluder Device. Pediatr Cardiol 2003;24:298–299.

XIV. Rohit M, Nandakumar S, Bahl A, Kubba S, Talwar KK. Transcatheter Closure Of Aortopulmonary Window. Indian Heart J 2005;57:161–163.