ISSN: 2091-2331 (Print) 2091-234X (Online)

Journal of Nobel Medical College

Volume 15, Number 01, Issue 28, January-June 2026, 110-112

Case Report

Balloon Pulmonary Valvuloplasty with Mammoth Balloon

Chandra Mani Adhikari, Reeju Manandhar, Anjana Acharya, Ravi Shahi, Subodh Bir Singh Kansakar

Department of Cardiology, Shahid Gangalal National Heart Centre, Kathmandu, Nepal

Article Received: 10th April, 2026; Accepted: 15th May, 2026; Published: 30th June, 2026

DOI: https://doi.org/10.3126/jonmc.v15i1.96441

Abstract

Balloon pulmonary valvuloplasty is standard therapy for pulmonary stenosis. The procedure can be done with different balloon catheter. We report a Balloon pulmonary valvuloplasty with the Mammoth balloon in an adult with severe pulmonary stenosis. The device showed good trackability, stability, and rapid inflation. Mammoth balloon appears effective, though larger studies are needed to confirm long-term outcomes.

Keywords: *Balloon valvuloplasty, Cardiac catheterization, Pulmonary valve stenosis*

Introduction

Balloon pulmonary valvuloplasty (BPV), defined as the percutaneous dilation of the pulmonary valve using a balloon catheter, is currently considered the therapeutic modality of choice for the treatment of pulmonary stenosis (PS) across all age groups [1]. Over time, different catheter designs and procedural techniques have been developed to improve outcomes in BPV, including: Balloon-tipped angiographic (Berman) catheter [1, 2], Double-balloon technique [3], Tyshak balloon series (NuMED, Hopkinton, NY) [4], Inoue balloon,and Accura balloon [3, 5]. Different balloon systems used in balloon pulmonary valvuloplasty (BPV) have distinct advantages and limitations [4]. Mammoth Balloon by Meril India is a low-profile (9 French compatible) non-compliant, single-layer, over-the wire balloon catheter mostly used for Transcatheter Aortic valve implantation (TAVI) has a double-lumen body with a balloon fixed in the distal part. The external lumen is used for filling and emptying the balloon. The internal catheter's lumen enables the passage of the guidewire.We report a case of BPV with the Mammoth balloon.

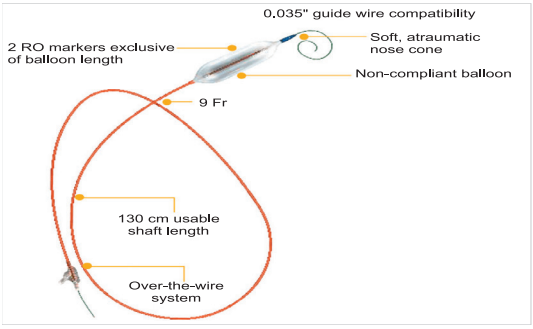

Figure 1: Mammoth over-the-wire ballon catheter system.

***Corresponding Author:**
Dr. Chandra Mani Adhikari
Cardiologist
Email: topjhap@gmail.com
ORCID: https://orcid.org/0000-0001-5811-9977

Citation
Adhikari CM, Manandhar R, Acharya A, Shahi R, Kansakar SBS, Balloon Pulmonary Valvuloplasty with Mammoth Balloon, JoNMC. 15:1 (2026) 110-112. DOI: https://doi.org/10.3126/jonmc.v15i1.96441 v15i1.96432.

Case report

An adult patient was referred for BPV as she was diagnosed as severe valvular PS. She complained of shortness of breath on exertion. Echocardiogram revealed Trans pulmonary valve gradient of 134 mmHg shown in Figure 2. Pulmonary valve annulus was 18 mm. Patient was planned for BPV. BPV was done under local anesthesia with prior informed consent. As per standard protocol, intravenous heparin is given at a total dose of 100U/kg after sheath insertion. A 10F right femoral vein access was obtained.A 6F Judkins Right (JR) catheter was then introduced into the right heart over a 0.032 “angled tip Terumo wire and placed distal to the stenotic pulmonary valve in left pulmonary artery. Over the JR catheter a Amplatzer superstiff wire was anchored distally in the left pulmonary artery, followed by removal of the JR catheter.

Through the Amplatzer superstiff wire a 20x40 mm Mammoth balloon was passed through the pulmonary valve and inflated as shown in Figure 3. After the BPV gradient across the pulmonic valve decreased to 37mmHg as shown in Figure 4.

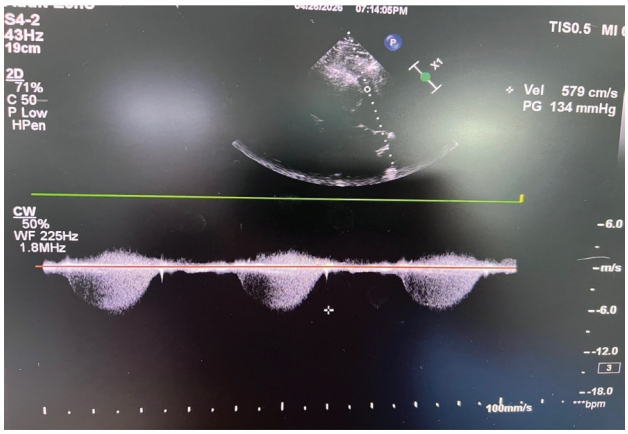

Figure 2: Trans pulmonary gradient before BPV

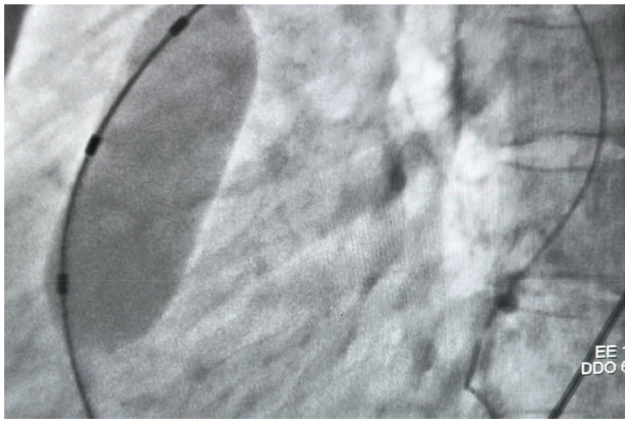

Figure 3: BPV with Mammoth 20x40 balloon

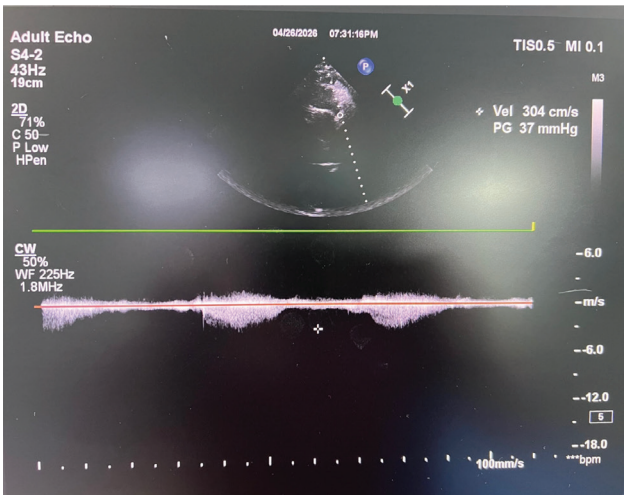

Figure 4: Trans Pulmonary gradient after BPV.

Discussion

BPV represents the earliest percutaneous balloon dilatation procedure and remains the most successful among all percutaneous balloon valvuloplasty techniques [6]. The first attempt at percutaneous pulmonary valve intervention was performed in the early 1950s by Rubio Alverez and Rubio and Limon-Lason [1, 2]. They utilized a ureteral catheter with a wire to mechanically split the stenotic pulmonary valve. A major advancement was the introduction of the static balloon dilatation technique by Kan et al., which significantly refined the procedure and improved its safety and efficacy [7].

Different balloon systems used in balloon pulmonary valvuloplasty (BPV) have distinct advantages and limitations [4]. The Tyshak balloon (NuMED, Hopkinton, NY) is the most commonly used balloon by interventional cardiologists for BPV. It has been specifically designed for pulmonary valve dilation, with several modifications over time to: reduce the catheter profile and maintain resistance to balloon rupture [4]. Despite its widespread use, the Tyshak balloon has several notable disadvantages:“Melon-seeding” effect, leading to: difficulty in maintaining stable positioning during inflation more pronounced in smaller-sized balloons. Balloon instability, which may contribute to: procedural difficulty, inconsistent dilation, prolonged inflation and deflation times, potentially causing:bradycardia and hypotension [5, 8, 9]. Risks associated with longer balloons: injury to the tricuspid valve apparatus, rare occurrence of complete heart block due to atrioventricular node injury [10]. Graded dilations of the pulmonary valve are not possible with the single bal-

loon so requires multiple balloon exchange.
Inoue (Toray Industries, Inc.) and Accura (Vascular Concepts, UK) balloons are widely used in BPV are originally designed for percutaneous transluminal mitral commissurotomy (PTMC). They provide some Advantages Over Single-Balloon (Tyshak) Technique, which include:- Size-adjustable design, enables stepwise (graded) dilatation [11], eliminates need for multiple balloon exchanges [9], short inflation–deflation cycle (~3–5 s) which minimizes hemodynamic compromise.They have Self-positioning property which improves stability [10], achieve perfect commissurotomy [9, 12], and reduces: balloon displacement and injury to RV infundibulum or main pulmonary artery [5, 11, 12].
Mammoth Balloon comes in the Myval TAVI valve set so can be accessible to TAVI centers. The balloon is known for its high-pressure, compliant characteristics suitable for controlled expansion. Its composition material is Vestamid Care ML2. It is available in 6 different diameters (from 14 mm to 30 mm) with a length of 40 mm. This balloon There are two X-ray-proof markers, it helps in properly positioning the balloon during the procedure [13]. When we used the balloon for BPV, it was sized like the Tyshak Balloon, Acura, and Inoue ballon. It advanges include; low profile (9F compatible), trackable, no Melon seeding during inflation, short inflation time and deflation time with good result of BPV.

Conclusion

BPV with Mammoth balloon is found to be convenient and effective but need large scale long-term outcome study.

Acknowledgement: None
Conflict of interest: None

References

[1] Semb BKH, Tijonneland S, Stake G, Balloon Valvulotomy of congenital pulmonary valve stenosis with tricuspid valve insufficiency, Cardiovasc Intervent Radiol. 2 (1979) 239-41. DOI:10.1007/BF02552069.
[2] Pepine CJ et al., Percutaneous Balloon Valvuloplasty for Pulmonic Valve Stenosis in the Adult, Am J Cardiol. 50 (1982) 1442-5. DOI:10.1016/0002-9149(82)90491-x.
[3] Al Kasab S, Ribeiro PA, Al Zaibag M, et al., Percutaneous double balloon pulmonary valvotomy in adults: One- to two-year follow-up, Am J Cardiol. 62:10Pt1 (1988) 822-4. DOI: 10.1016/0002-9149(88)91234-9.
[4] Osamah Aldoss, Daniel Gruenstein. Percutaneous Balloon Pulmonary Valvuloplasty, Pediat Therapeut. S5:003 (2012). DOI:10.4172/2161-0665.S5-003.
[5] Lau KW, Hung JS, Wu JJ, Chern MS, Yeh KH, Fu M, Pulmonary valvuloplasty in adults using the Inoue balloon catheter, Cathet Cardiovasc Diagn. 29:2 (1993) 99-104. DOI: 10.1002/ccd.1810290203.
[6] Ezhumalai B, Awasthy N, Ananthakrishna A, Satheesh S, Jayaraman B, Long-Term Follow-Up Analysis of Percutaneous Balloon Pulmonary Valvuloplasty: Experience of an Indian Tertiary Care Hospital, J Clin Trial Cardiol. 3:1 (2016) 1-5. DOI:10.15226/2374-6882/3/1/00137.
[7] Kan JS, White RI Jr, Mitchell SE, Gardner TJ, Percutaneous balloon valvuloplasty: a new method for treating congenital pulmonary-valve stenosis, N Engl J Med. 307:9 (1982) 540–542. DOI:10.1056/NEJM198208263070907.
[8] Behjati-Ardakani M, Sadr-Bafghi SM, Andishmand A. Combined transcatheter closure of atrial septal defect and pulmonary valve balloon dilation. Acta Med Iran. 50:10 (2012) 710-712.
[9] Deora S, Vyas C, Shah S, et al., Percutaneous balloon pulmonary valvuloplasty: A modified over-the-wire Inoue balloon technique for difficult right ventricular anatomy, Indian Heart J. 66:2 (2014) 211-213. DOI: 10.1016/j.ihj.2013.12.010.
[10] Sofi NU, Sachan M, Sinha SK, Jha MJ, Pandey U, Razi M et al., Accura balloon dilatation catheter for percutaneous balloon pulmonary valvuloplasty among adult patients-its protean use, Am J Cardiovasc Dis. 13:3 (2023)152-161. PMID: 37469531.
[11] Bahl VK, Chandra S, Wasir HS, Pulmonary valvuloplasty using Inoue balloon catheter, Int J Cardiol. 45:2 (1994) 141-143. DOI: 10.1016/0167-5273(94)90271-2.
[12] Patel TM, Dani SI, Shah SC, Shah UG, Patel TK, Inoue- Balloon pulmonary valvuloplasty using a free-float technique, J Invasive Cardiol. 8:8 (1996) 374-377. PMID: 10785735.
[13] Moscardelli S, Caminiti R, Montonati C, Ceresa F, De Blasio G, Vizzari G et. al., Performance of the Mammoth Balloon Catheter in Patients with Severe Aortic Valve Stenosis Undergoing Percutaneous Treatment, J Clin Med. 13:19 (2024) 5986. DOI: 10.3390/jcm13195986.