



Supplementary material

Interventional Therapies in Pulmonary Hypertension

SUPPLEMENTARY MATERIAL

Table 1 of the supplementary material

Worldwide Experience of Atrial Septostomy for Pulmonary Arterial Hypertension

AUTHOR	PATIENTS LOCATION	PATIENTS (NO.)	PROCEDURES (NO.)	AGE, Y	FEMALE, %	IPAH, %	NYHA/WHO CLASS
NIHILL ET AL. ¹	USA	14	14	20.5 ± 12	78.6	43	3.8 ± 0.4
SOBRINO ET AL. ²	SPAIN	3	3	36 ± 5	33	67	4.0 ± 0
KERSTEIN ET AL. ³	USA	15	16	24.9 ± 11.3	87	100	3.53 ± 0.52

THANAPOULOS ET AL. ⁴	GREECE	6	6	6.1 ± 2.6	NA	100	3 ± 0
RICH ET AL. ⁵	USA	6	6	38.8 ± 7.7	83	100	3.7 ± 0.5
HAYDEN ET AL. ⁶	USA	6	6	** 35	83	100	4.0 ± 0
SANDOVAL ET AL. ⁷	MEXICO	15	22	33 ± 9	87	87	3.6 ± 0.6
ROTHMAN ET AL. ⁸	USA	12	13	37 ± 12	83	75	3.6 ± 0.5
KOTHARI ET AL. ⁹	INDIA	11	11	16.2 ± 8.9	36	64	3.62±0.69
REICHENBERGER ET AL. ¹⁰	UK	17	20	35.9 ± 14.2	71	76	3.7 ± 0.5
STÜMPER ET AL. ¹¹	UK	4	4	63.5 ± 11	NA	100	NA

KURZYNA ET AL.¹²	POLAND	2	2	26.5 ± 6.4	100	100	4.0 ± 0
ALLCOCK ET AL.¹³	UK	9	12	56.4 ± 22.4	100	67	3.7 ± 0.5
VACHIERY ET AL.¹⁴	BELGIUM	16	18	NA	NA	89	3.6 ± 0.4
MICHELETTI ET AL.¹⁵	UK	20	22	8.4 ± 5.6	55	95	3.5 ± 0.5
KURZYNA ET AL.¹⁶	POLAND	11	14	33.0 ± 12	54.5	82	3.3 ± 0.5
CIARKA ET AL.¹⁷	BELGIUM	11	11	48.0 ± 5	54.5	55	3.5 ± 0.5
LAW ET AL.¹⁸	USA	43	46	** 12.5	81	67	3-4
O'BYRNE ET AL.¹⁹	USA	5	5	29.4 ± 10.5	60	100	3-4

LAMMERS ET AL. ²⁰	UK	7	7	8.9 ± 5.4	57	100	3.1 ± 0.4
TROOST 2009 ET AL. ²¹	BELGIUM	15	17	48.2 ± 20.5	80	33	4.0 ± 0
FENSTAD ET AL. ²³	USA	8	11	40.0 ± 13	89	100	3 - 4
SANDOVAL ET AL. ²⁴	MEXICO	34	50	35.0 ± 10	85	85	3.5 ± 0.6
BAGLINI ET AL. ²⁵	ITALY	11	11	42.5 ± 12	54.5	73	3.6 ± 0.5
KUHN ET AL. ²⁶	USA	16	23	47.6 ± 11.3	75	44	3.8 ± 0.4
CHIU ET AL. ²⁶	USA	32	46	** 23	74	63	3 - 4
PAN X ET AL. ²⁷	CHINA	5	5	29 ± 15	40	100	3.6 ± 0.5

VELÁZQUEZ ET AL.²⁸	SPAIN	10	11	43.5 ± 13.4	80	60	3-4
TOTAL		364	432		68%	76%	3-4

IPAH, IDIOPATHIC PULMONARY ARTERIAL HYPERTENSION; NYHA/WHO, NEW YORK HEART ASSOCIATION/WORLD HEALTH ORGANIZATION. MODIFIED FROM SANDOVAL ET AL.⁸ WITH PERMISSION.

**** MEDIAN.**

Table 2 of the Supplementary material

Worldwide Experience of Atrial Septostomy for Pulmonary Arterial Hypertension

Author	Symptoms, %			Procedure (No.)			Reduction in RAP, %	Increase in cardiac index, %	Reduction in SaO ₂ %, %	Procedural death, %
	Syncope	RHF	Both	Blade	BDAS	Combined				
Nihill et al. ¹	36	43	21	0	4	10	-2	36	-14	14.2
Sobrinho et al. ²	0	100	0	0	3	0	-43	53	-36	33
Kerstein et al. ³	47	0	53	4	0	12	-15	24	-9	16.5
Thanapoulos et al. ⁴	50	0	50	0	6	0	-20	39	-12	0
Rich et al. ⁵	0	100	0	4	0	2	-41	58	-13	33.3
Hayden et al. ⁶	0	17	83	0	6	0	-27	67	-11	33.3
Sandoval et al. ⁷	27	53	20	0	22	0	-39	35	-10	4.5
Rothman et al. ⁸	50	42	8	0	13	0	-22	24	-9	15.3

Kothari et al. ⁹	9	73	18	0	11	0	-16	16	-10	18.1
Reichenberger et al. ¹⁰	24	59	18	0	20	0		29	-6	20
Stümper et al. ¹¹	NA	NA	NA	0	4	0				0
Kurzyna et al. ¹²	0	100	0	0	2	0		19	-12	50
Allcock et al. ¹³	100	0	0	0	12	0			-9	5
Vachery et al. ¹⁴	NA	NA	NA	0	18	0			-3	5.5
Micheletti et al. ¹⁵	60	35	5	2	17	3			-8	0
Kurzyna et al. ¹⁶	0	0	100	0	14	0	-5	16	-9	0
Ciarka et al. ¹⁷	9	73	18	0	11	0	-27	27	-8	0
Law et al. ¹⁸	42	51	7	30	5	11	-16	26	-8	4.3
O'Byrne et al. ¹⁹	40	40	20	0	4	1				0
Lammers et al. ²⁰	43	57	0	0	7	0				0
Troost et al. ²¹	0	100	0	0	17	0			-5	5.8
Fenstad et al. ²²	0	100	0	0	11	0				0
Sandoval et al. ²³	26	41	32	0	50	0	-26	31	-8	
Baglini et al. ²⁴	0	100	0	0	11	0		44	-6	0
Kuhn et al. ²⁵	31	0	69	0	23	0	2	16	-9	4.3
Chiu et al. ²⁶	41	46	13	0	46	0	-11	4	-3	0
Pan X et al. ²⁷	0	100	100	0	5	0	-15	29	-12	0
Velázquez et al. ²⁸	NA	NA	NA	0	11	0		20	-7	0
Total	25.4	53.2	21.4	42 (9%)	353 (82%)	39 (9%)	-20.1%	30.7%	-9.9%	9.3%

BDAS, BALLOON DILATION ATRIAL SEPTOSTOMY; RAP, RIGHT ATRIAL PRESSURE; RHF, RIGHT HEART FAILURE; SAO₂%, ARTERIAL OXYGEN SATURATION.

***MODIFIED FROM SANDOVAL ET AL.⁸ WITH PERMISSION.**

REFERENCES TO THE SUPPLEMENTARY MATERIAL

1. Nihill MR, O'Laughlin MP and Mullins CE. Effects of atrial septostomy in patients with terminal cor pulmonale due to pulmonary vascular disease. *Cathet Cardiovasc Diagn.* 1991;24:166-72.
2. Sobrino N, Frutos A, Calvo L, Casamayor LM, Arcas R. Palliative interatrial septostomy in severe pulmonary hypertension. *Rev Esp Cardiol.* 1993;46:125-128.
3. Kerstein D, Levy PS, Hsu DT, et al. Blade balloon atrial septostomy in patients with severe primary pulmonary hypertension. *Circulation.* 1995; 91: 2028-2035.
4. Thanopoulos BD, Georgakopoulos D, Tsaousis GS, Simeunovic S. Percutaneous balloon dilatation of the atrial septum: immediate and midterm results. *Heart.* 1996;76:502-506.
5. Rich S, Dodin E, McLaughlin VV. Usefulness of atrial septostomy as a treatment for primary pulmonary hypertension and guidelines for its application. *Am J Cardiol.* 1997;80:369-371.
6. Hayden AM. Balloon atrial septostomy increases cardiac index and may reduce mortality among pulmonary hypertension patients awaiting lung transplantation. *J Transpl Coord.* 1997;7:131-133.
7. Sandoval J, Gaspar J, Pulido T, et al. Graded balloon dilation atrial septostomy in severe primary pulmonary hypertension. A therapeutic alternative for patients non-responsive to vasodilator treatment. *J Am Coll Cardiol.* 1998;32:297-304.
8. Rothman A, Slansky MS, Lucas VW, et al. Atrial septostomy as a bridge to lung transplantation in patients with severe pulmonary hypertension. *Am J Cardiol.* 1999;84:682-686.

9. Kothari SS, Yusuf A, Juneja R, et al. Graded balloon atrial septostomy in severe pulmonary hypertension. *Indian Heart J.* 2002;54:164-169.
10. Reichenberger F, Pepke-Zaba J, McNeil K, et al. Atrial septostomy in the treatment of severe pulmonary arterial hypertension. *Thorax.* 2003;58:797-800.
11. Stümper O, Gewillig M, Vettukattil J, et al. A modified technique of stent fenestration of the atrial septum. *Heart.* 2003;89:1227-1230.
12. Kurzyna M, Dabrowski M, Torbicki A, et al. Atrial septostomy for severe primary pulmonary hypertension. Report of two cases. *Kardiol Pol.* 2003;58:27-33.
13. Allcock RJ, O'Sullivan JJ, Corris PA. Atrial septostomy for pulmonary hypertension. *Heart.* 2003;89:1344-1347.
14. Vachery JL, Stoupe E, Boonstra A, Naeije R. Balloon atrial septostomy for pulmonary hypertension in the prostacyclin era. *Am J Respir Crit Care Med.* 2003;167:A692.
15. Micheletti A, Hislop A, Lammers A, et al. Role of atrial septostomy in the treatment of children with pulmonary arterial hypertension. *Heart.* 2006;92:969-972.
16. Kurzyna M, Dabrowski M, Bielecki D, et al. Atrial septostomy in treatment of end-stage right heart failure in patients with pulmonary hypertension. *Chest.* 2007;131:947-948.
17. Ciarka A, Vachery JL, Houssiere A, et al. Atrial septostomy decreases sympathetic overactivity in pulmonary arterial hypertension. *Chest.* 2007; 131: 1831-1837.
18. Law MA, Grifka RG, Mullins CE, Nihill MR. Atrial septostomy improves survival in select patients with pulmonary hypertension. *Am Heart J.* 2007;153:779-784.

19. O'Byrne ML, Berman-Rosenzweig ES, Barst RJ. The effect of atrial septostomy on the concentration of brain-type natriuretic peptide in patients with idiopathic pulmonary arterial hypertension. *Cardiol Young*. 2007;17:557-559.
20. Lammers AE, Derrick G, Haworth SG, et al. Efficacy and long-term patency of fenestrated amplatzer devices in children. *Catheter Cardiovasc Interv*. 2007;70:578-584.
21. Troost E, Delcroix M, Gewillig M, Van Deyk K, Budts W. A modified technique of stent fenestration of the interatrial septum improves patients with pulmonary hypertension. *Catheter Cardiovasc Interv*. 2009;73:173-179.
22. Fenstad ER, Le RJ, McGoon MD, et al. Atrial Septostomy in Patients with Pulmonary Arterial Hypertension. *Circulation*. 2011;124:A9476.
23. Sandoval J, Gaspar J, Peña H, et al. Effect of Atrial Septostomy on the Survival of Patients with Severe Pulmonary Arterial Hypertension. *Eur Respir Journal*. 2011;38:1343-1348.
24. Baglini R. Atrial septostomy in patients with end-stage pulmonary hypertension. No more needles but wires, energy and close anatomical definition. *J Interv Cardiol*. 2013;26:62-68.
25. Kuhn BT, Javed U, Armstrong EJ, et al. Balloon dilation atrial septostomy for advanced pulmonary hypertension in patients on prostanoid therapy. *Catheter Cardiovasc Interv*. 2015;85:1066-1072.
26. Chiu JS, Zuckerman WA, Turner ME, et al. Balloon atrial septostomy in pulmonary arterial hypertension: effect on survival and associated outcomes. *J Heart Lung Transplant*. 2015;34:376-380.

27. Pan X, Wang C, Zhang Y, et al. Short-term efficacy of atrial septostomy in the treatment of idiopathic pulmonary arterial hypertension patients complicating with right heart failure. *Zhonghua xin xue Guan Bing za Zhi*. 2015;43:319-322.
28. Velázquez Martín M, Albarrán González-Trevilla A, Jiménez López-Guarch C, García Tejada J, Martín Asenjo R, Escibano Subías P. Use of atrial septostomy to treat severe pulmonary arterial hypertension in adults. *Rev Esp Cardiol*. 2016;69:78-81.