Balloon Angioplasty in CTEPH

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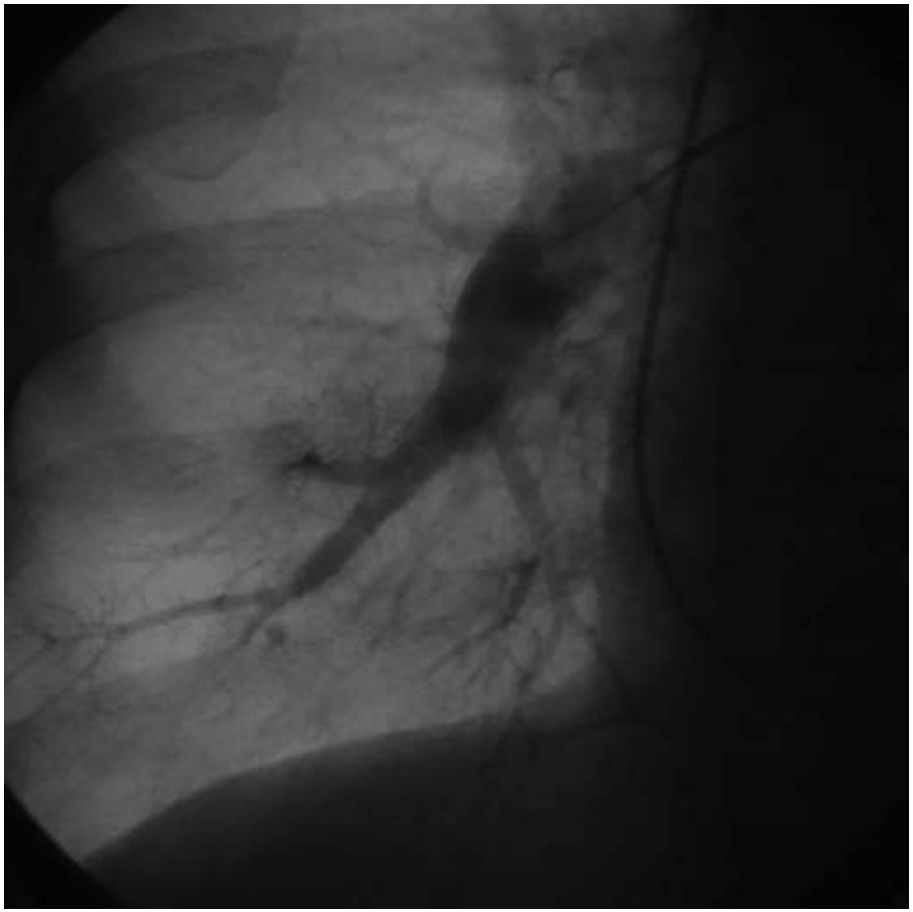
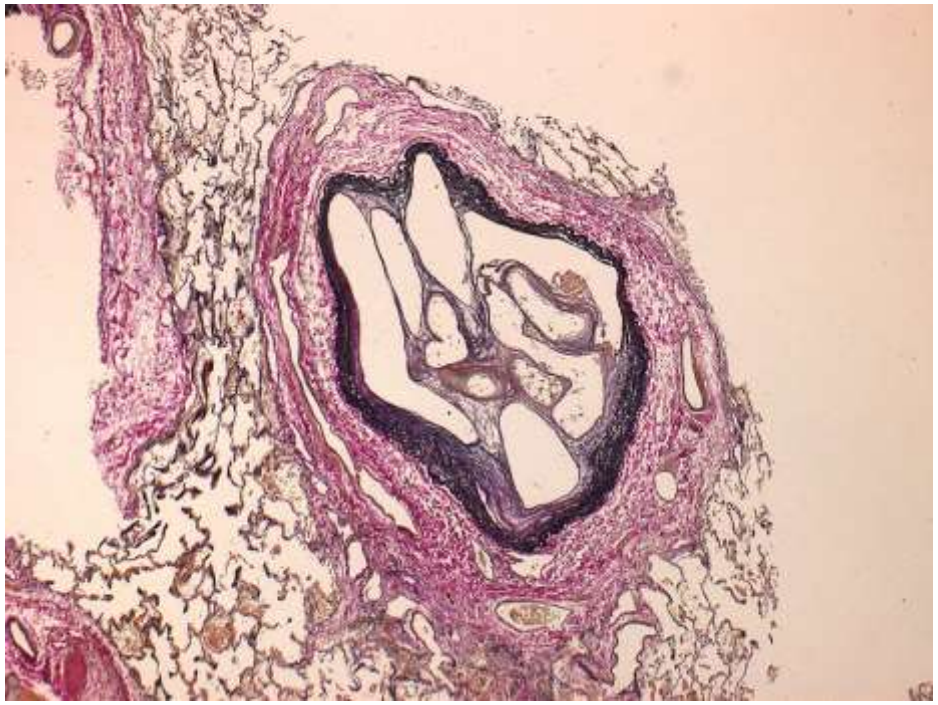
Chronic Thromboembolic Pulmonary Hypertension (CTEPH)





- CTEPH is caused by the stenoses or obstructions of pulmonary arteries due to organized thrombi.
- The organized thrombus in CTEPH has become a part of pulmonary arterial structure.

Balloon Pulmonary Angioplasty (BPA)

Selective PAG

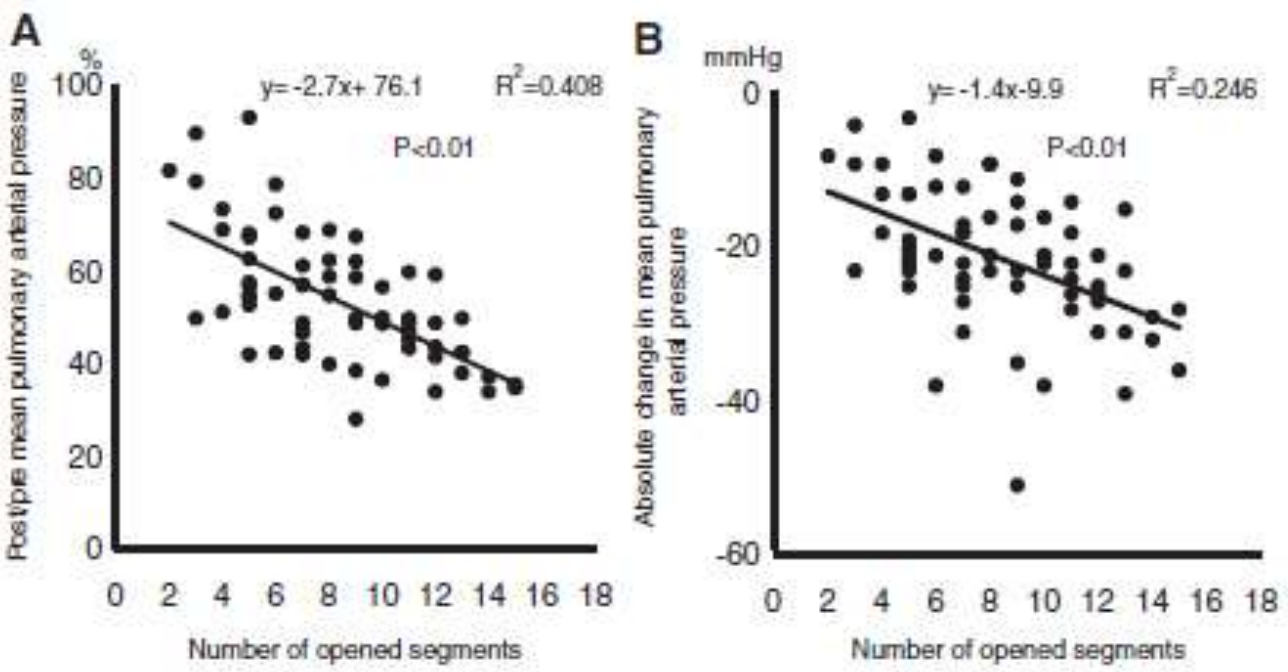
Balloon dilatation

Post BPA

To decrease the patients' PAP,

- Increase the number of treated lesions
- Sufficient improve of stenosis in every lesion

Relation between number of treated segments and decrease of mPAP after BPA



Mizoguchi H, et al. Circ Cardiovasc interv. 2012; 5: 748-755

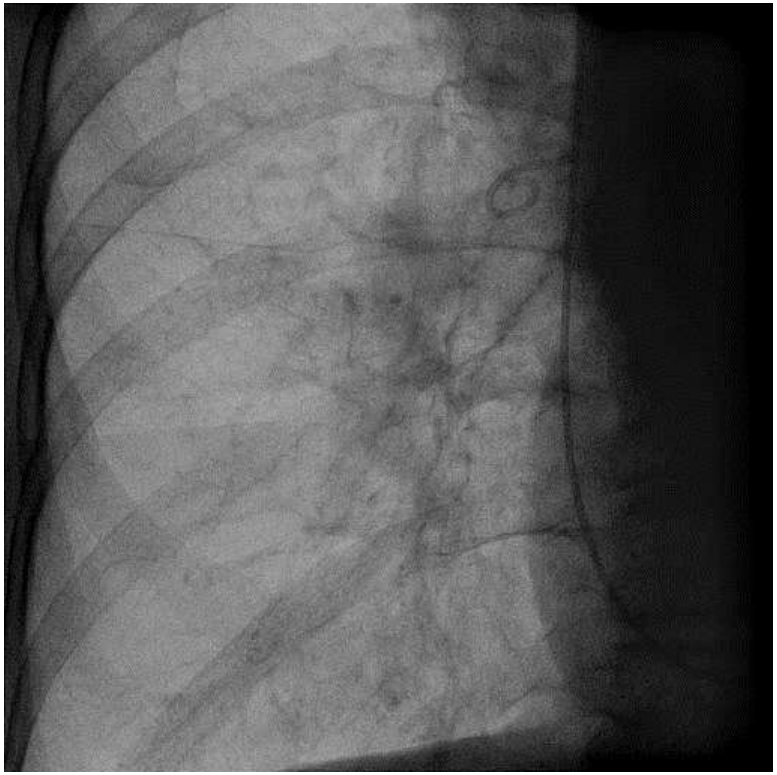
BPA Strategy until 2012

- Fully dilating 2-3 lesions in a procedure
- Repeating 4-5 procedures to increase the number of treated lesions

Representative PAG before and after BPA

(64 years old, female)

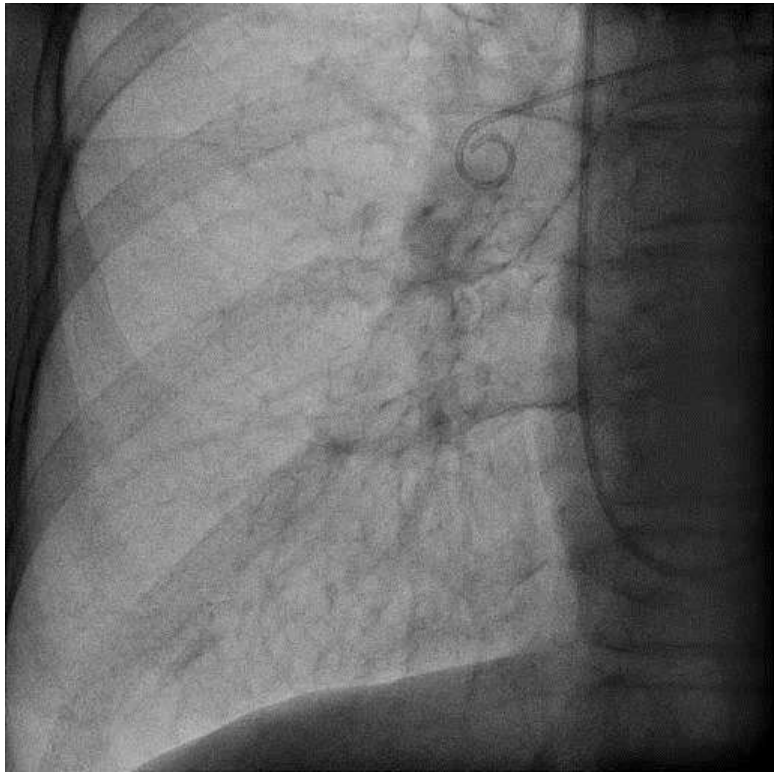
Before BPA



PAP 92/37(57) mmHg

PVR 1846 dyne sec cm^{-5}

2 year after 10th BPA



PAP 33/8(19) mmHg

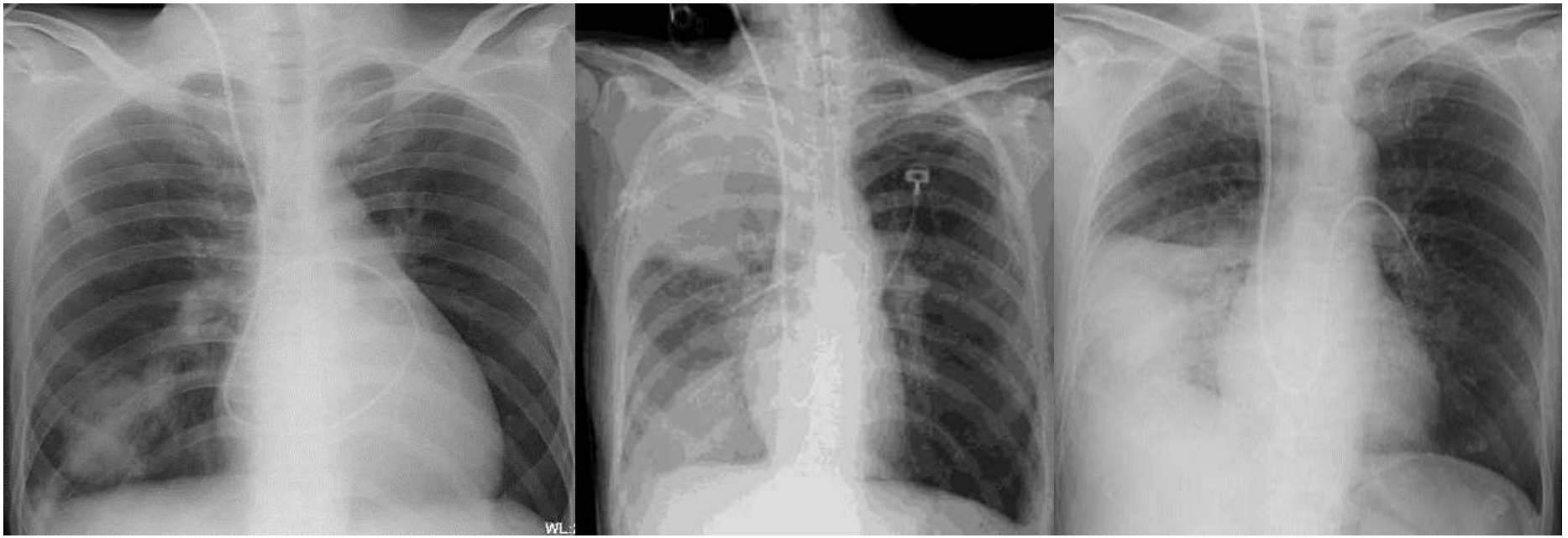
PVR 401 dyne sec cm^{-5}

The latest outcomes of BPA at Okayama medical center
(Nov 2004 – Jan 2016)

	Before BPA (n = 297)	After BPA (n = 255)	Follow-up (n = 199)
6MWD (m)	267 ± 137	380 ± 95*	409 ± 111*
Systolic PAP (mmHg)	73.8 ± 21.1	39.7± 9.9*	34.6 ± 8.4*
Mean PAP (mmHg)	42.5± 12.0	23.4 ± 5.4*	20.6 ± 4.9*
RAP (mmHg)	7.2 ± 4.5	3.3 ± 2.5*	3.8 ± 3.1*
CI (L/min/m^2)	2.7 ± 0.8	3.0 ± 0.9*	2.6 ± 0.6
PVR (dyne sec cm^{-5})	696 ± 336	321± 127*	276 ± 108*

BPA, balloon pulmonary angioplasty; follow-up, 1.8 ± 1.3 years (range, 0.3–6 years) after the final BPA; 6MWD, 6-minute walking distance; PAP, pulmonary artery pressure; RAP, right atrial pressure; CI, cardiac index; PVR, pulmonary vascular resistance; *, $p < 0.05$ vs. before BPA
The patient's number before BPA include 7 cases of in-hospital death (in-hospital mortality rate, 2.4 %).

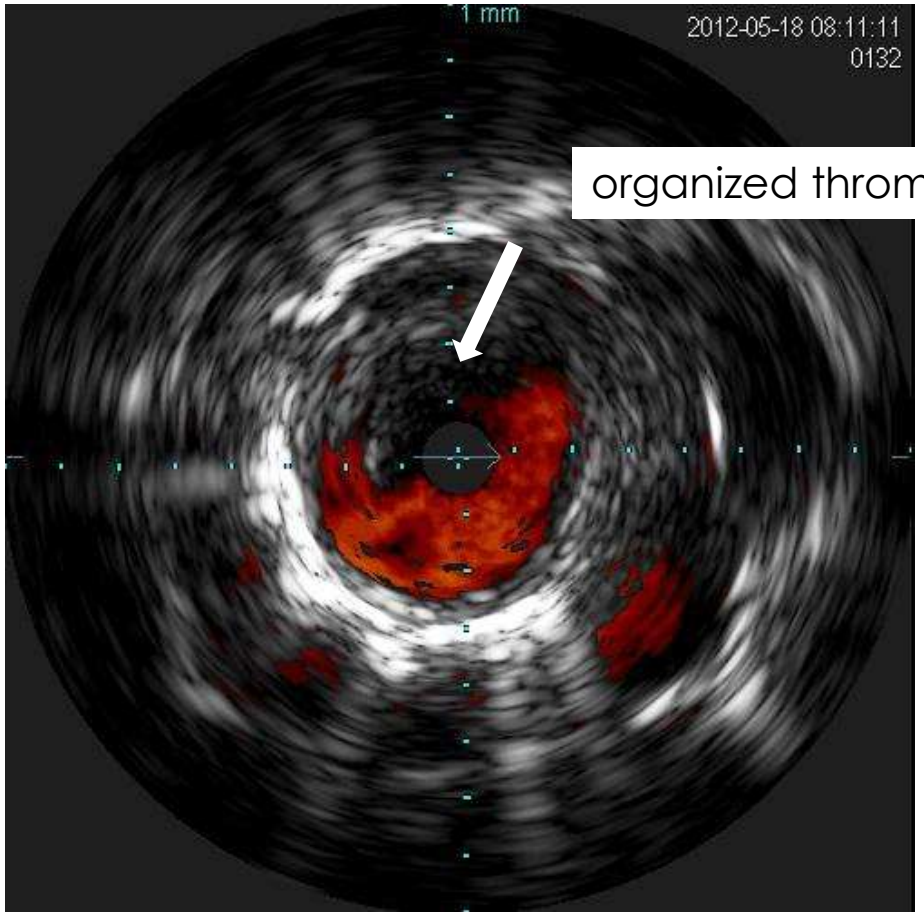
Complication; Pulmonary injury

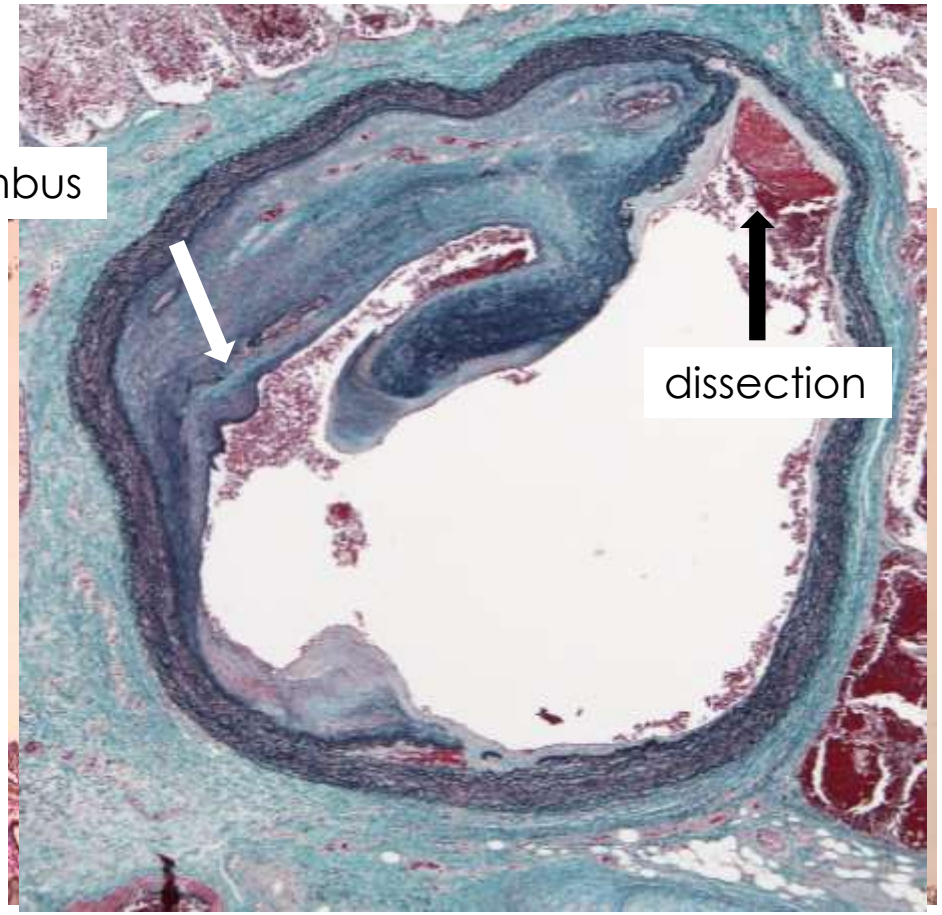


Among initial 103 patients,

- 60 % of patients developed pulmonary injury
- 12% of patients needed intratracheal intubation

IVUS/Pathological Findings of Dilated Lesion





Kitani M et al, Circ Cardiovasc Interv. 2014;7:857-9.

Representative Procedure of current BPA (rt A9)

Initial procedure

before **after**

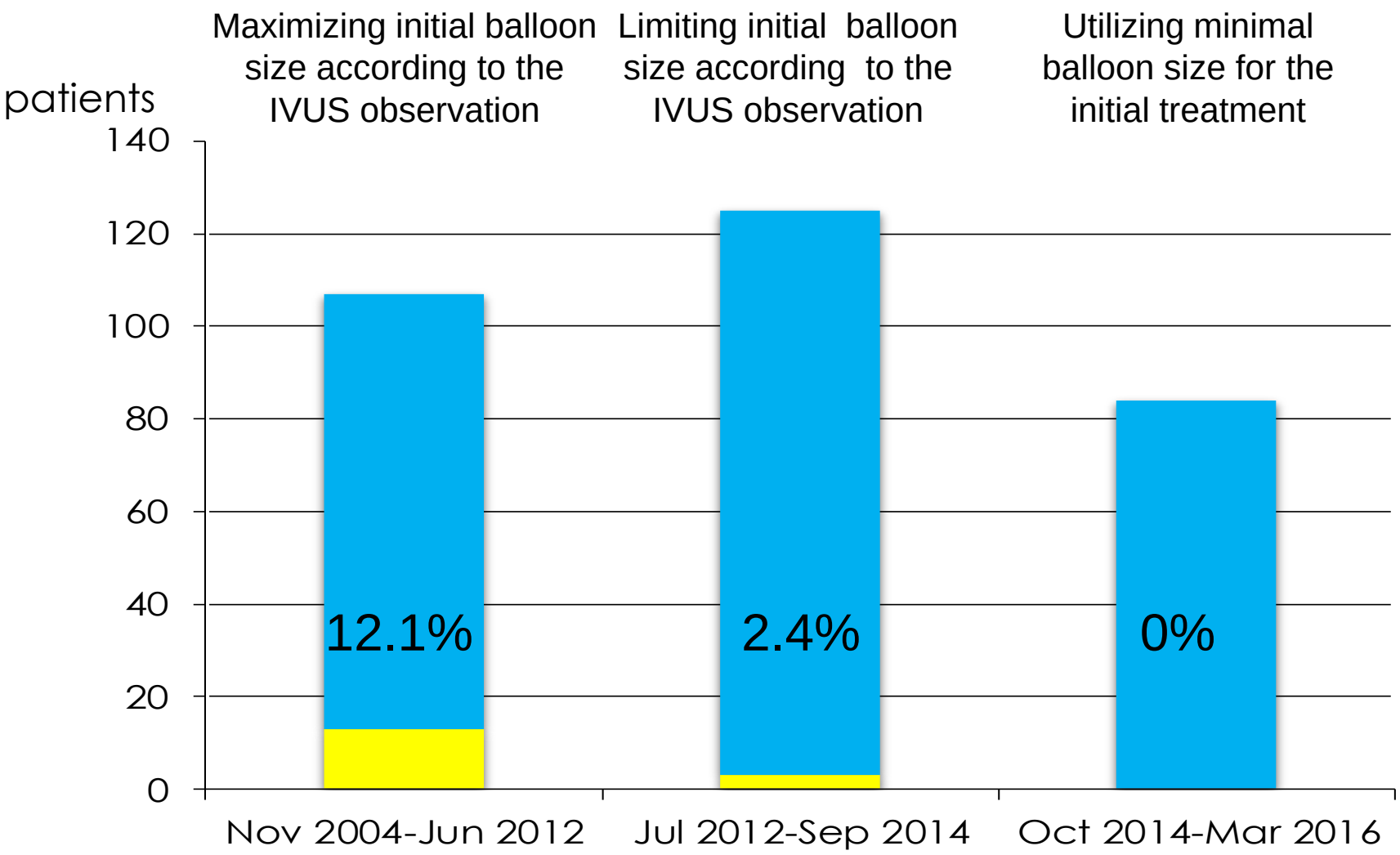
Third procedure

(1 month later)

Current BPA strategy

- Minimally dilating as many lesions as possible in a procedure
- Repeating procedures to add the optimal dilatation to the lesions

Occurrence of sever pulmonary injury



Conclusion

- **Sufficient decrease of PA pressure in patients with CTEPH could be obtained by BPA.**

- **Serious complication after BPA could be significantly diminished by simply avoiding vascular injury caused by procedures.**

- **Our current BPA would be promising alternative treatment for patients with CTEPH.**