



Balloon Pulmonary Valvuloplasty in the Management of Valvar Pulmonary Stenosis

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The technique of balloon dilatation proposed by Dotter, Grüntzig and their associates was adopted by Kan and her associates [1] to treat valvar pulmonary stenosis (PS) in children in the early/mid 1980s. The immediate [1, 2], short-term [3–5] and long-term [6] results have been satisfactory in relieving pulmonary valve obstruction. The procedure is equally effective in neonates and adults. However, some problems remain at all three stages.

At the time of balloon pulmonary valvuloplasty (BPV), development of infundibular obstruction was observed; this is more frequent in severe PS cases and in older subjects but resolves spontaneously in most patients with occasional need for betablocker therapy [7, 8].

At short-term follow-up, recurrence of PS was observed in approximately 10% of patients following BPV [9, 10]. The reasons for recurrence were found to be balloon/annulus (BA) ratio less than 1.2 and immediate post-BPV pulmonary valve peak gradients greater than 30 mmHg [9]. Consequently, BA ratios of 1.2 to 1.4 were recommended for BPV [9]. Recurrent stenosis is successfully addressed by repeating BPV with larger balloons than used initially [10].

Long-term follow-up results [6] revealed continued relief of obstruction, but with development of pulmonary insufficiency (PI), some patients requiring replacement of the pulmonary valve [11]. While several risk factors were identified for development of PI at long-term follow-up after BPV, large BA ratios appear to be the most common feature among all the studies reviewed. It was concluded that BPV is the treatment of choice in the management of valvar PS and that BA ratio used for BPV should be lowered to 1.2 to 1.25 [12, 13]. It was also suggested that strategies should

be developed to prevent/reduce PI at long-term follow-up. It is expected that such smaller balloons are likely to give acceptable relief of pulmonary valve narrowing while at the same time may avoid significant PI at long-term follow-up. Pathak and his associates investigated to see if performing BPV with balloons using BA ratios ≤ 1.2 minimizes PI than when BA ratios > 1.2 are used [14]. The results indicated that while relief of pulmonary valve obstruction is similar between groups, the smaller BA ratio group had significantly less PI. However, the follow-up duration was short (mean of 15.2 mo). If these findings are confirmed for long-term follow-up study, using smaller balloons would be beneficial.

In summary, there is conclusive evidence for relief of pulmonary valve obstruction in neonates, children, and adults immediately after BPV and at follow-up. Restenosis at short-term follow-up can be successfully addressed by repeating BPV with slightly larger balloons. The development of significant PI at late follow-up is a significant finding and that efforts to establish the causes of late onset of PI, to develop approaches to circumvent such a problem, and to commence careful long-term follow-up studies to validate the findings are desirable. The study of Pathak and his associates [14] is one step in the right direction and hopefully, future long-term follow-up studies will confirm these findings. The author recommends using BA ratios of 1.2 to 1.25 for BPV until additional data become available.

Declarations

Conflict of Interest None.

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