

Valvuloplasty for treating deep venous reflux

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Techniques

RL Kistner reported the first surgical repair of an incompetent deep vein valve in 1968. Since its initial description of internal valvuloplasty¹ using a longitudinal venotomy other techniques have been described. Raju advocated a supra-valvular, transverse phlebotomy² and Sottiurai a supra-valvular, "T-shaped" venotomy³. For internal valvuloplasty we used the latter with some minor modifications⁴.

Kistner introduced external valvuloplasty in 1990⁵, which is performed without the use of a venotomy. The disadvantages of external valvuloplasty include the lack of direct visualization and, possibly a less precise reapproximation of the cusps. We have seldom used external valvuloplasty as a single procedure but in complement to internal valvuloplasty.

In order to compensate this drawback, Gloviczki has proposed in 1991 angioscopic-assisted valvuloplasty⁶ but long-term results using this technique have never been published.

As in some cases an increased luminal diameter -secondary to progressive dilatation of the vein walls- results in reflux simply because the valve cusps do not meet, some authors prompted the use of an external band to reduce the diameter of the vein and maintain valve competence^{7,8}. But it is worthy to note that in presence of a "floppy valve" the most frequent and actual anatomical

abnormality which defect has been shown to be an elongation of the cusp edge, diameter-shrinking efficiency remains debatable.

Selection of patients: Patients with clinical evidence of chronic venous insufficiency (CVI) require a thorough evaluation prior to consideration for valve repair. Complete history, clinical examination and duplex scanning allows ranking the patient according to the CEAP classification.

In primary etiology when deep venous reflux exists it is frequently associated with superficial±perforator insufficiency. The later abnormalities must be treated first regardless of the severity of the CVI and postoperative compression prescribed. If the CVI is not improved surgical correction of the deep system should be considered on the clinical status of the patient (severe lipodermatosclerosis or ulcer) rather than on vascular laboratory findings. Descending and ascending venograms have to be carried out in combination with AVP measurement. The former demonstrates the location of the valves and the degree of reflux and can distinguish the typical elongated, redundant valve from the postthrombotic one or the valvular aplasia (congenital). In accordance with most of the authors reflux graded 3 or 4 as stated by Kistner⁹ with intact valve cusps only are considered potential candidates for valvuloplasty.

It is critical to determine the reflux status of the profunda femoris vein (PFV). When dealing with primary reflux, repair of the most proximal valve in the superficial femoral vein (SFV) will usually suffice if the PVF is competent. However, single repair of the proximal SFV valve when the PVF is incompetent is detrimental. In this situation both repair of the proximal SFV and PFV valves must be carried out. The popliteal valve below the junction of the DFV to the deep axial vein provides an alternative repair location.

Table 1.
Valvuloplasty Results

	Surg. Techn.	No Limbs (# valves repaired)	Etiology PVI	Follow-up in months (average)	Clinical Results Ulcer recurrence (%)	Hemodynamic results Competent valve (%)	□ AVP ■ RT
Masuda and Kistner ¹⁰	I	32	/	60-252 (127)	(50)*	24/31 (77)	□ **81% (m) ■ **56% (m)
Raju ¹¹	I	68 (71)	/	12-144	16/68 (26)	30/71	/
Raju ¹¹	E	47 (111)	/	12-70	14/47 (30)	72/111	/
Raju ¹¹	W	22 (72)	/	12-84	6/22 (27)	60/72	/
Sottiurai ^{12,13}	I	143	/	9-168 (81)	9/42 (21)	107/143 (75)	/
Eriksson ¹⁴	I	27	27/27	(49)		19/27 (70)	□ **81% (m) ■ **50% (m)
Perrin ¹⁵	I	85 (94)	65/85	12-96 (58)	10/35 (28,6)***	64/83 (77)	■ Normalized 63,2%

I= Internal valvuloplasty; E= External valvuloplasty; PVI= Primary venous insufficiency; W= Wrapping; **= improved; (m)= Mean; AVP= Ambulatory venous pressure; RT= Refilling time with tourniquet; *= no or mild reflux; ***= Ulcer recurrence or non healed ulcer.

In postthrombotic syndrome valvuloplasty is rarely feasible. But in few patients with distal postthrombotic lesions a repairable proximal valve can be identified. As in the primary group the status of the PVF is crucial.

Results

The mid-term and long-term results provided by valvuloplasty are now available. Good results, defined as freedom from ulcer recurrence have been achieved in 50%-79%

(Table 1) and the reduction of pain to mild levels in 62-80%. Valve competence is usually predictive of the clinical result and direct imaging has demonstrated this to be present in approximately 70% of the repairs.

The operative morbidity is minimal and no perioperative death has been reported. Wound infection (2-4%) and seroma formation (2-4%) are reported sporadically. The previous fear of widespread deep venous thrombosis following valve repairs has not been realized with only a 0-11% incidence in multiple series.

Conclusion

Chronic venous insufficiency related to primary venous reflux and very limited number of postthrombotic reflux is amenable to direct surgical repair of the incompetent valve(s). Patients should be carefully selected on the basis of clinical status and preoperative testing, and surgery should be considered only after optimal medical management and when less aggressive surgical procedures have failed to control their signs and symptoms.

Internal valvuloplasty remains the 'gold standard procedure' and has proven to be a valuable procedure resulting in good long-term clinical results. Other techniques such as external valvuloplasty, whether video-assisted or not and external banding lack of long term follow-up assessment to be recommended as routine procedures. Overall good results can be expected in approximately 70% of properly selected patients.

References

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