Reduction Internal Valvuloplasty (RIVAL) A New Technique For Deep Vein Valve Reconstruction: Early Results

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## Longitudinal Internal Valvuloplasty by Kistner



## Transverse Internal Valvuloplasty by Raju



## "T" Internal Valvuloplasty by Sottiurai (Modified by Perrin)



## Trapdoor Internal Valvuloplasty by Tripathi



#### "Reefing" - mainstay of valve repair



## Neo-intimal Hyperplasia

- A possible disadvantage of the reefing technique is the resultant heaped up commissural junctions by excessive plicated valvular rugal folds.
- This may result in areas of increased cicatrization that may be space occupying with reduction of functional valve area as seen in our previous experience.

## Post-Valvuloplasty Thrombosis

Supra-valvular Technique (Raju)4.5%Modified "T" Sottiurai Technique (Perrin)8.8%Trapdoor Technique (Tripathi)6.7%

Valve resorption 6.1% of valve stations

Cumulatively, these two complications accounted for 12.8% of valvuloplasty





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#### Reduction internal valvuloplasty is a new technical improvement on plication internal valvuloplasty for primary deep vein valvular incompetence

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Fig 1. A, Intervalvular distance. B, Transcommissural diameter.





## Reducing incision in high shear areas







Reflux level, Kistner grade	Valve repaired	No. of valves repaired	Competent valves (VCT <1 second)	Ulcer healing (limbs)
	Single level	n = 6	4	3/6 (50%)
Grade III	CFV	3 valves	3 (75%)	
	CFV	1 valve	1 (25%)	
Grade IV	FV	2 valves	0	
Grade IV	Multilevel = 38 valves (19 limbs)		36	19/19 (100%)
	CFV + upper thigh FV	18 (9 limbs)	17 (47.3%)	
	CFV + PV above knee	16 (8 limbs)	15 (41.6%)	
	CFV + PV below knee	4 (2 limbs)	4 (11.1%)	

Table. Relationship of reflux, valve repaired, and ulcer healing by the reduction internal valvuloplasty (RIVAL) technique

CFV, Common femoral vein; FV, femoral vein; PV, popliteal vein; VCT, valve closure time.



95.4% SE 2%	95.4% _SE 2%	92.6% SE 7% I	92.0% SE 3.7%	88.9%	Fig 6. Competend reduction internal error.	cy and ul valvulopla	cer healin asty (RIV)	g during AL) techr	a 2-year j iique. <i>SE</i> ,	period by Standard
		I 88.0%	I 88.9% SE 6%	SE 6% 87.5% SE 5%		1 month	6 months	12 months	18 months	24 months
		SE 7%			- Valve competence (valves), %	95.4	95.4	92.6	92.0	87.5
	76.0%				- At risk	(42/44)	(42/44)	(39/42)	(23/25)	(21/24)
	SE 3.5%				SE	2%	2%	<b>7%</b>	3.7%	<b>5%</b>
I DAY					Ulcer healing (limbs), %	68	76	88	88.9	88.9
SF 2%					At risk	(17/25)	(19/25)	(21/24)	(16/18)	(16/18)
56 270					SE	2%	3.5%	7%	6%	6%
1 month	6 months	12 Months	18 months	24 months						

# **RIVal Technique - Conclusions**

- 1. Complete departure from the reefing technique that has so far been the mainstay of valvuloplasties.
- 2. Based on valve station measurements in an attempt to make internal valvuloplasty an exacting objective procedure.
- 3. 100% patency and 87.5% competency of repaired valves.
- 4. Freedom from C6 ulcers at 2 years 88.9%
- 5. The RIVAL technique by trapdoor access has now replaced the earlier technique of reefing in our practice of repair of deep vein valves.