

TRANS-SEPTAL APPROACH: A SAFE TECHNIQUE FOR THE COMBINED MITRAL AND TRICUSPID VALVE PROCEDURE

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SUMMARY

Trans-septal approach has become an established alternative technique to the conventional right lateral approach in cases where inadequate exposure of the mitral valve is anticipated. This is especially useful in cases undergoing operation for combined mitral and tricuspid valves disease. We evaluated the safety of this technique in 20 patients who had combined mitral and tricuspid valvular lesions. All the patients had excellent exposure of the mitral valve. There were no rhythm problems. Thus the trans-septal approach is a useful technique for mitral valve surgery especially when there is associated tricuspid valvular disease.

INTRODUCTION

Key to the successful mitral valve surgery lies in the optimal exposure. Conventional left lateral approach for mitral valve surgery is a time honoured technique but not the absolute one. Under certain circumstances such as small left atrium, dense adhesions from previous procedures, presence of rigid aortic prosthesis, atrial calcification and large organized thrombus,¹ this conventional approach fails to provide adequate exposure. Also in cases where associated tricuspid valve pathology needs correction the conventional approach has to be combined with additional right atriotomy. We at our institute have adopted trans-septal approach to the mitral valve for all cases requiring concomitant tricuspid valve surgery. We are presenting a retrospective analysis of our experience.

MATERIAL AND METHODS

We have adopted the trans-septal approach to the mitral valve for routine use when concomitant tricuspid valve operation

is required. Twenty patients were operated upon between Jan 1995 and April 1998 (Table-I). There were 07 male and 13 female patients. The age range was 17 years to 55 years. One of the patient had previous closed mitral commissurotomy. Eighteen patients had mitral valve replacement, one had open mitral commissurotomy, and one had combined aortic and mitral valve replacement. All the patients had tricuspid valve annuloplasty.

OPERATION TECHNIQUE

Median sternotomy incision is used. Cardiopulmonary bypass is established with ascending aortic and bicaval cannulation; cooling the patient to 28^o C. Antegrade cold crystalloid cardioplegia is infused in the aortic root. Topical slush is used for surface cooling. An oblique right atriotomy incision is used after snaring the venacavae. Septal incision is made in the posterior portion of fossa ovalis. After the mitral valve procedure is performed the incision in the fossa ovalis is closed with a continuous 3-0

TABLE - I
PATIENT CHARACTERISTIC

TOTAL NO	20
MALE	07
FEMALE	13
AGE RANGE	17-55
DOMINANT M.S.	04
DOMINANT M.R.	16
TRICUSPID REGURGITATION	20
SINUS RHYTHM	03
ATRIAL FIBRILLATION	17

polypropylene suture. Tricuspid valve repair is then performed using Devegas annuloplasty technique, Right atriotomy is closed and caval tapes released.

RESULTS

Adequate exposure of the mitral valve was achieved in all the cases. No significant morbidity was noted except in one case who had transient atrioventricular nodal block with junctional rhythm. At that time her serum potassium was 2.3 meq/l. After the restoration of serum potassium to normal range sinus rhythm was restored but still there were frequent episodes of ventricular bigeminies and episodes of junctional rhythm. Xylocain 2% infusion was started and continued for 18 hours post operatively

TABLE - II
OPERATION RECORD

TRANS-SEPTAL APPROACH	20
CPB TIME RANGE	55-95 min
AVERAGE CPB TIME	78 min
CROSS CLAMP TIME RANGE	42-60 min
AVERAGE CROSS CLAMP TIME	51 min
MITRAL VALVE REPLACEMENT	18
OPEN MITRAL VALVOTOMY	01
MVR + AVR	01
TRICUSPID VALVE REPAIR	20

when stable sinus rhythm was achieved. No incidence of right atriotomy bleeding was noted. One important observation was prolonged cross clamp time as compared to conventional right lateral atriotomy incision.

DISCUSSION

Good exposure is a pre requisite for successful surgery of the mitral valve right lateral left atriotomy incision gives excellent exposure in a virgin, enlarged left atrium.² When the left atrium is small, previous mitral valve surgery have been performed or the mitral valve annulus is calcified then the conventional right lateral incision gives trouble-some exposure and excessive traction is applied to get the valve implanted. To over-come this problem many routes of surgical access to the mitral valve have been described.^{3,4,5,6}

Trans-septal exposure of the mitral valve was initially reported by Julian and colleagues.⁷ Subsequently, other authors have advocated various technical modifications. Major concern regarding the trans-septal approach is damage to the conduction fibers coming from sino atrial node to the atrioventricular node thus causing post operative rhythm disturbances.^{3,9} However it has been confirmed by different studies that if the septal incision is in the posterior septal tissue and does not extend high into the superior septal rim then the chances of conduction block are remote. Chang and co-workers¹⁰ have demonstrated that the most rapid spread of atrial conduction during sinus rhythm occurs preferentially through the thick muscle bundles of the anterior limbus in contrast to slower conduction through the fossa ovalis. Thus the usual trans-septal incision confined to the fossa ovalis and the postero lateral tissues of the limbus would not interfere with the conduction fibers. Our operative technique is based on the same principle and our results confirm that trans-septal approach does not cause conduction defect. Bowman and

Malms⁹ observed that heart block in their earlier series of trans-septal procedures was primarily due to an incision placed partially in the anterior limbus.

McGrath, Levett and Gonzalezlavin have reported their experience with trans-septal approach without a single occurrence of transient or permanent atrioventricular dissociation¹¹.

The prolonged cross clamp time reported in our study did not cause myocardial damage, or the need for strong inotrope support. One reason for extra x-clamp time is the marking and repair of atrial septotomy. Also in our technique the tricuspid repair was done while the aorta was clamped.

Trans-septal approach avoids undue traction on the right atrium, intra atrial septum and right ventricle. Also in redo cases it avoids unnecessary dissection for exposing interatrial groove. Trans-septal approach has the advantage over superior septal approach in that it avoids sacrificing the sinus node artery and the risk of conduction block. In cases where tricuspid valve repair is anticipated this approach gives excellent exposure of both the mitral and tricuspid valves. The right atriotomy incision is easier to close than the left atriotomy where homeostatic closure especially of the corners when the incision is extended deep under the vena cavae for better exposure becomes troublesome. There was not a single incidence of right atriotomy bleeding in our series.

CONCLUSION

We have found that the trans-septal approach provides good exposure of the mitral valve and especially in cases where concomitant tricuspid valve repair is done. It avoids left atriotomy in the first place and prevents the redissection and re-closing of the left atrium and pulmonary veins in the redo cases. It carries lower risk of complications.

REFERENCES

1. Craig R, Smith. Septal superior exposure of the mitral valve. The transplumb approach. *J Thorac Cardiovas Surg.* 1992; 103: 623.
2. Jean Paul A, Couetil, Ahmad Ramsheyyi, Michael J, Tolan D, Fier F, Loulmet, et al. Biatrial inferior trans-septal approach to the mitral valve. *Ann Thorac Surg.* 1995; 60: 1432.
3. Alfieri O, Sandrelli L, Pardin A, et al. Optimal exposure of the mitral valve through an extended vertical trans-septal approach. *Eur J Cardiothorac Surg.* 1991; 5: 294.
4. Braner HB. 1992 update (1985; combined superior and right lateral left atriotomy with division of the superior venal cava for exposure of the mitral valve). *Ann thorac surg.* 1992; 54: 194.
5. Kon ND, Tucker WY, Mills SA, Laverder SW, Cordell AR. Mitral valve operation via an extended trans-septal approach. *Ann Thorac Surg.* 1993; 55: 1413.
6. Brawley K. Improved exposure of the mitral valve in patients with a small left atrium. *Ann Thorac Surg.* 1980; 29: 179.
7. Julian OC, Lopex M, Dye WS, et al. Simultaneous repair of mitral and tricuspid valves through right atrium and interatrial septum. *Arch surg.* 1959; 78: 745.
8. Zacharias A. Alternative method to improve exposure for difficult mitral valves procedures. *Ann Thorac Surg* 1986; 42: 336.
9. Bowman FO, Malm JR. The trans-septal approach to mitral valve repair. *Arch Surg.* 1965; 90: 329.
10. Chang BC, Schyessler RB, Stone CM, et al. Computerized activation sequence mapping of the human atrial septum. *Ann Thorac Surg.* 1990; 49: 231.
11. Mc Grath LB, Levett JM, Gonzalez- Lavin L, Safety of the right atrial approach for combined mitral and tricuspid valve procedures. *J Thorac Sug.* 1988; 96: 756.