Reoperation for Left Ventricular Outflow Tract Obstruction After Repair of Atrioventricular Septal Defect

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No disclosures
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Welcome to Spring in Minneapolis!
Objectives

• **Morphology of LVOT** in AVSD
• Anatomy of LVOTO in repaired AVSD
• Surgical strategies for LVOTO
• Technical details to optimize outcomes
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- *Technical details* to optimize outcomes
Outcomes: Repair of AVSD

- N = 93
- Median f/u: 37.3m
- Early mortality: 0%
- Late mortality: 2.2%
- Pacemaker: 7.5%
- MR reop: 19.4%

Primary Biventricular Repair of Atrioventricular Septal Defects: An Analysis of Reoperations
Hunaid A. Vohra, Alicia X.F. Chia, Ho Ming Yuen, Joseph J. Vettukattil, Gruschen Veldman, James Gnanapragasam, Kevin Roman, Anthony P. Salmon and Marcus P. Haw
Ann Thorac Surg 2010;90:830-837
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Reoperation for LVOTO: 2.2%
Outcomes for Repair of Subaortic Stenosis

• Mortality 2%

• Recurrent LVOTO 15-20%

• Permanent pacer 2-15%
Late Survival and LVOTO

**Fig 3.** Overall actuarial survival after reoperation for relief of left ventricular outflow tract obstruction is shown. There was a significant difference ($p < 0.001$) when compared with an age-matched and gender-matched healthy population.
Morphology of LVOT in AVSD

- “Unwedged” aorta
- Inlet/outlet septal length disparity
- Muscular septal deficiency (“septal scoop”)
- Anterolateral muscle bundle of LV
- Anomalies of subvalvar AV apparatus
Morphology of LVOT in AVSD

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Morphology of LVOT in AVSD; Abnormal Septal Geometry


Morphology of LVOT in AVSD: Ventricular Septal “Scoop”

50% of CAVSD specimens had anterosuperior extension of septal scoop
Those with such extension had significantly narrower LVOT
Depth of scoop did not affect LVOT diameter
Morphology of LVOT in AVSD

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Morphology of LVOT in AVSD:
Anterolateral Muscle Bundle of LV

Morphology of LVOT in AVSD:
Anterolateral Muscle Bundle of LV

- Horizontal bar between ALMV and LCC in LVOT
- Present in 40% of normal hearts

Morphology of LVOT in AVSD: Anterolateral Muscle Bundle of LV

- Present in all AVSD specimens (n=77)
- Mild to moderate hypertrophy in 43%
- Unequivocal LVOTO in 6%

Morphology of LVOT in AVSD

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- Inlet/outlet septal length disparity
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- Anomalies of subvalvar AV apparatus
Morphology of LVOT in AVSD: Subvalvar AV Apparatus
Morphology of LVOT in AVSD: Subvalvar AV Apparatus
# Outcomes for LVOTO Surgery After AVSD Repair

**SUBAORTIC STENOSIS IN THE SPECTRUM OF ATRIOVENTRICULAR SEPTAL DEFECTS** Solutions may be complex and palliative

Glen S. Van Arsdell, Md\(^a\)(by invitation), William G. Williams, MD\(^a\), Christine Boutin, MD\(^b\)(by invitation), George A. Trusler, MD\(^a\), John G. Coles, MD\(^a\), Ivan M. Rebeyka, Md\(^a\) (by invitation), Robert M. Freedom, MD\(^b\), c(by invitation)

Toronto, Ontario, Canada

- 19 patients
- 18/19 fibrous resection
- 7/19 LAVV procedure
- Freedom from reoperation 66% at 6 years
Outcomes for LVOTO Surgery After AVSD Repair

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Toronto, Ontario, Canada

“Standard fibromyectomy for subaortic stenosis in children with atrioventricular septal defect leads to a high rate of reoperation.”
Outcomes for LVOTO Surgery After AVSD Repair

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Toronto, Ontario, Canada

“Because of the potential for multiple causes of obstruction, a tailored operation may be necessary.”
Outcomes for LVOTO Surgery After AVSD Repair

Improving Left Ventricular Outflow Tract Obstruction Repair in Common Atrioventricular Canal Defects

Patrick O. Myers, MD, Pedro J. del Nido, MD, Gerald R. Marx, MD, Sitaram Emani, MD, John E. Mayer, Jr, MD, Frank A. Pigula, MD, and Christopher W. Baird, MD

Departments of Cardiovascular Surgery and Cardiology, Children's Hospital Boston and Harvard Medical School, Boston, Massachusetts

56 patients
41 fibrous resection, 22 LAVV procedure,
27 myectomy, 5 modified Konno, 9 Ao valve repair
Freedom from reoperation 81% at 5 years
Outcomes for LVOTO Surgery After AVSD Repair

Improving Left Ventricular Outflow Tract Obstruction Repair in Common Atrioventricular Canal Defects

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Ann Thor Surg 2012;94:599-605

“…LVOTO in AVC is a complex, multifactorial disease that is difficult to address. Aggressive surgical repair has improved late outcomes; however, risk factors for reoperation, and the ideal approach for repair remain to be defined.”
Surgical Options for LVOTO After AVSD Repair

- Transaortic resection
- Modified Konno
- Leaflet resuspension
Surgical Options for LVOTO
Modified Konno

Surgical Options for LVOTO
Modified Konno

- Recurrent, complex, multilevel LVOTO
- Distal LVOT visualization key
- Risks: ventriculotomy, residual VSD, aortic valve injury
Surgical Options for LVOTO
Leaflet Resuspension

Surgical Options for LVOTO
Leaflet Resuspension

- Partial or Transitional AVSD

- Limited data

- Impact limited by chordal length
Pre- Repair TEE
Post Repair TEE
Conclusions

- Incidence of LVOTO after AVSD repair ~ 2%
- Anatomic basis of LVOTO after AVSD repair is multifactorial
- Role of surgical technique is creating LVOTO unclear
Conclusions

• Surgery must address fibromuscular, valvar, and septal/tunnel elements of LVOTO
• Transaortic resection is usually effective
• Modified Konno and leaflet resuspension are useful adjuncts
Thank You!
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Repair of Subaortic Stenosis in Atrioventricular Canal With Absent or Restrictive Interventricular Communication by Patch Augmentation of Ventricular Septum, Resuspension of Atrioventricular Valves, and Septal Myectomy

Jacques A. M. van Son, M.D., Ph.D., Peter Schneider, M.D., and Volkmar Falk, M.D.