1171 Clinical Pediatric Cardiology

Wednesday, April 1, 1998, 9:00 a.m.–11:00 a.m.
Georgia World Congress Center, West Exhibit Hall Level
Presentation Hour: 9:00 a.m.–10:00 a.m.

1171-154 Transcatheter Balloon Dilation Versus Surgery for Native Aortic Coarctation in Children – A Clinical Decision Analysis

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Background: Balloon dilation of native aortic coarctation (CoA) remains controversial. We sought to assess utilities related to outcomes of balloon dilation vs. surgery in a formal decision analysis.

Methods: A clinical decision tree with probabilities of outcomes and complications was developed using contemporary results reported in 20 published series (813 balloon dilations, 1458 surgeries of native CoA in children). Preferences for outcomes (utilities) were assessed in modified standard gamble interviews of 10 pediatric cardiologists, 14 fellows, 3 clinic nurses and 4 cardiac surgeons at a single institution. Final utility scores ranged from 0 (death) to 1 (perfect procedure) for isolated CoA in a 2–10 yr old.

Results: Initial preferences were for balloon in 30 and surgery in 1 (surgeon). After interviews and decision tree analyses, mean final utility scores favored balloon (0.988 ± 0.012) vs. surgery (0.962 ± 0.036; p = 0.0001) with only 1 cardiology fellow having a higher score for surgery. There were no significant differences between the groups of respondents regarding final scores, although the surgeons were more clearly a draw (mean difference 0.008 ± 0.007; p = 0.25). Sensitivity analysis favored surgery only if the chance of major complication with balloon exceeded 56%, or mortality with balloon exceeded 6%. The chance of aneurysm or restenosis did not alter the decision favoring balloon.

Conclusion: Based on systematic analysis of outcomes and complications and their value, transcatheter balloon dilation of isolated native CoA in children is preferable to surgery.

1171-156 Echocardiography as the Definitive Diagnostic Modality for the Preoperative Evaluation of Complex Congenital Heart Defects

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Although echocardiography (echo) is well established as the first line imaging technique for the diagnosis of congenital heart disease (CHD), most institutions continue to perform cardiac catheterization (cath) prior to complete repair of complex CHD. We assessed the accuracy of echo in the preoperative diagnosis of children with complex CHD undergoing primary complete repair without cath. To determine error rates by echo alone versus echo with cath, we reviewed the records of 420 children with complex CHD who underwent complete repair at our institution from 7/92 to 12/96. We included children with atrioventricular canal (n = 80), coarctation of the aorta (106), interrupted aortic arch (11), tetralogy of Fallot (105), transposition of the great arteries (61), truncus arteriosus (32) and total anomalous pulmonary venous return (25). We excluded children with less complex defects such as isolated shunt lesions, as well as those with more complex defects that would require surgical palliation (e.g., functional univentricular heart). We defined major errors as those that increased surgical risk to the patient, while minor errors did not increase risk. Errors in diagnosis were determined at surgery. 84% (352/420) of children underwent surgery with preoperative diagnosis by echo alone. There were 5/352 major (1.4%) and 12 minor errors in the echo alone group and 1/68 major (1.5%) and 3 minor errors in those that also underwent cath. There was no difference in the overall error rate between the 2 groups (4.8% vs 5.8%, p = 0.76). No error in either group resulted in complications. This study suggests that echo is an accurate tool in the preoperative diagnosis of complex CHD in most children undergoing primary complete repair. Echo may be used as the definitive diagnostic modality without increasing the risk of diagnostic error, and may obviate the need for routine diagnostic cath.

1171-157 Transmission of Full-Length Real-time Echocardiograms Over ISDN Facilitates Care of Congenital Heart Disease

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Background: Infants at remote community hospitals with suspected cardiac defects may require urgent pediatric cardiology consultation and/or immediate transfer to tertiary centers. Use of new telecommunication technology may enhance diagnostic and consultative support.

Methods: We reviewed the impact on patient management and infant referrals to Children's Memorial Hospital (CMH) from Northwest Community Hospital, 30 miles away, of videoconferencing systems linked by ISDN (Integrated Services Digital Network) lines. The technology allowed rapid point-to-point interactive digital communication and real-time transmission of full-length echocardiograms.

Results: Between 3/15/94 and 4/22/97, 91 transmissions were performed on 88 infants. The transmitted studies were abnormal in 43 (47%) and normal in 48 (53%). Reasons for referral were: murmur (62 pts), cyanosis (13 pts), tachypnea (4 pts), and others (5 pts). An abnormal study was seen in 22/62 pts (35%) with murmur, and 9/13 pts (69%) with cyanosis. The referring neonatologists' management plan, if telemedicine were not available, would have been: immediate transfer (12 pts), urgent (<2 hrs) cardiology visit (18 pts) and semi-urgent visit (58 pts). Two of 12 pts (17%) thought for immediate transfer, and 11 of 18 pts (61%) thought to require urgent visit, had normal studies. Actual immediate transfer to CMH for surgical or therapeutic intervention occurred on 11 of 88 pts (13%). Others with abnormal findings only required observation or neonatal therapy at the referring site (13 pts), or were scheduled for outpatient follow-up (19 pts). All diagnoses on transmitted echocardiograms were accurate.

Conclusions: Use of videoconferencing technology provided transmission of diagnostic-quality full-length studies, altered clinical managemet decisions, and expedited the most appropriate management protocol.

1171-158 Detection of Initial Signs of Congenital Heart Disease in Newborns: Implications for Early Hospital Discharge

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Background: A critical reason to avoid early postpartum discharge is delay of diagnosis of a life-threatening but treatable condition. We examined the impact that early release policies (<48 hrs of age) may have on the health of newborns by determining the exact hour of initial symptoms in normal birth weight neonates with the most frequent cause of death: congenital heart disease (CHD).

Methods: Patients born in Ohio between 1/1/92 and 12/31/96 and presenting to our institution with significant CHD (symptomatic, requiring medical attention) had birth histories reviewed to determine the exact time of presentation of the first symptom(s) that eventually led to the diagnosis of CHD.

Results: A total of 276 patients met study criteria; 43 were excluded because birth records could not be obtained. Mean birth weight was 3.38 kg, and mean gestational age was 39 weeks. Excluded were 46 patients diagnosed by fetal echo, by prenatal ultrasound, or with other congenital anomalies. Neonates presented 73.3% of the time by 12 hrs of life, 81.3% by 24 hrs, 87.2% by 36 hrs, 89.8% by 48 hrs, 90.4% by 60 hrs, and 90.9% by 72 hrs. Nurses first noted symptoms in 65.5% of the cases, physicians in 28.6% of cases, and parents in 6.0% of cases.

Conclusions: Only an additional 1.1% of neonates with CHD would be diagnosed by extending hospitalization from 48 to 72 hrs. However, an additional 8.5% of neonates with CHD would leave from their hospital of birth undiagnosed if all infants were released at 24 as opposed to 48 hrs of age.

1171-159 Interactive Telemedicine Cardiology in the Evaluation of Pediatric Heart Murmurs: A Double Blind Study

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Background: The East Carolina University School of Medicine telemedicine system allows real time patient interviews, electronic auscultation, and echocardiography (ECHO). This study evaluated the accuracy, patient satisfaction, and costs related to telemedicine pediatric cardiology evaluations.

Methods: All patients referred for a murmur evaluation to a single outreach clinic were offered enrollment in the study. Participants were examined by both a face to face physician (FTF), and then a telemedicine physician (TEL). Both physicians independently obtained tests deemed necessary (ECG and/or ECHO).

Over the one year study time, twenty-one patients agreed to participate. The diagnostic agreement was fair, with sixteen patients diagnosed as having a functional murmur in the FTF group and nineteen in the TEL group. One significant ventricular septal defect (VSD) was diagnosed by both TEL and FTF. Two small muscular VSDs were diagnosed by FTF, but missed by TEL. One of these VSDs was missed on telemedicine ECHO.

Results: The difference in rates of ordering echocardiograms was not statistically significant (P = 0.20 Fisher's exact test) between FTF (10 echos)