All congenital heart defects should be repaired for fear of Fatal Endocarditis!

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Overview

• Fatal endocarditis
• Congenital heart defects at risk
• Literature review
• How we do it?
• Experience at Ramathibodi
• Conclusion
Fatal endocarditis

- Endocarditis – inflammation of endocardium (the inner lining of the heart) that is almost always as a result of infective process.
- Endocarditis is always serious, and sometimes fatal.

- Modes of death
  - Mechanical failure- acute fulminating valvular regurgitation
  - Electrical disturbance- complete heart block
  - Septic process- virulence of microbial

- Complications related to infective process or embolism
  - Systemic embolism- superior mesenteric occlusion, cerebral infarction
  - Ruptured mycotic aneurysm
  - Aortic root abscess
Epidemiology and Prevention

Infective Endocarditis in Children With Congenital Heart Disease
Cumulative Incidence and Predictors

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Background—The American Heart Association guidelines for prevention of infective endocarditis (IE) in 2007 reduced the groups of congenital heart disease (CHD) patients for whom antibiotic prophylaxis was indicated. The evidence base in CHD patients is limited. We sought to determine the risk of IE in children with CHD.

Methods and Results—We performed a population-based analysis to determine the cumulative incidence and predictors of IE in children (0–18 years) with CHD by the use of the Quebec CHD Database from 1988 to 2010. In 47,518 children with CHD followed for 458,109 patient-years, 185 cases of IE were observed. Cumulative incidence of IE was estimated in the subset of 34,279 children with CHD followed since birth, in whom the risk of IE up to 18 years of age was 6.1/1000 children (95% confidence interval, 5.0–7.5). In a nested case-control analysis, the following CHD lesions were at highest risk of IE in comparison with atrial septal defects (adjusted rate ratio, 95% confidence interval): cyanotic CHD (6.44, 3.95–10.50), endocardial cushion defects (5.47, 2.89–10.36), and left-sided lesions (1.88, 1.01–3.49). Cardiac surgery within 6 months (5.34, 2.49–11.43) and an age of <3 years (3.53, 2.51–4.96; reference, ages 6–18) also conferred an elevated risk of IE.

Conclusions—In a large population-based cohort of children with CHD, we documented the cumulative incidence of IE and associated factors. These findings help identify groups of patients who are at the highest risk of developing IE. (Circulation. 2013;128:1412-1419.)
Endocarditis in children with congenital heart disease

- CHD is the most prevalent condition in children with IE.
- Surgical correction of any type of CHD.
- Implanted prosthetic materials put the patient to a higher risk of IE.

Figure 1. Derivation of the study population. CHD indicates congenital heart disease; IE, infective endocarditis; and PT, person-time.
Endocarditis and adult congenital heart disease (ACHD)

• Incidence 0.9-1.3/1000 patient-years
  1
• Non CHD 5-7/100,000 patient-years
  2
• Recurrent rate 20%
  3
• Mortality rate 4-16%
  1,2

High risks of IE on cardiac patients undergoing dental procedure

- Prosthetic cardiac valve or prosthetic material used for cardiac valve repair.
- Previous IE.
- Unrepaired cyanotic CHD, including palliative shunts and conduits.
- Completely repaired congenital heart defect with prosthetic material or device, whether placed by surgery or by catheter intervention, during the first 6 months after the procedure. In this case, prophylaxis is reasonable because endothelialisation of prosthetic material occurs within 6 months after the procedure.
- Repaired CHD with residual defects at the site or adjacent to the site of a prosthetic patch or prosthetic device (which inhibit endothelialisation).
- Cardiac transplantation recipients who develop cardiac valvulopathy.
Congenital heart defects at risk

- Shunt defect
  - Right-to-left shunt defect- TOF, PA/VSD
  - Left-to-right shunt- small/moderate VSD

- Previous surgery- Modified Blalock-Taussig shunt, RV-to-PA conduit, prosthesis.

- Transcatheter pulmonary valve replacement- Melody®

- Common feature - high turbulent flow causing eddy current
Fig. 1. Infected percutaneous valve removed from the pulmonary position in a patient with Tetralogy of Fallot.
Proposed mechanism of pathophysiology

• A shunt creates turbulent flow
• Endocardial injury
• Presence of microbes; bacteria or fungus
Other precipitating factors

- Access of microbes to circulation
  - Oral / dental hygiene or procedures
  - Wound
  - Body piercing or tattooing
  - IV drug addict

- Pre-existing shunt (VSD) or valvular lesion (bicuspid aortic valve)

- Previous endocarditis or rheumatic heart disease
In case of surgical or endoscopic procedures at risk for developing endocarditis

- Low risk
- Intermediate risk
- High risk
Endocarditis is almost always fatal.

CHD, even a simple lesion such as VSD, is at high-risk for IE.

Only high risk cases need IE prophylaxis before dental procedures.

However, risk and benefit of leaving the lesion alone versus repairing it must be weighed.

My personal opinion, as a surgeon experiencing severely damaged valves as a result of IE in VSD, I strongly recommend surgical correction of any CHD.