Natural History of Borderline Rheumatic Heart Disease in New Caledonia: a Prospective Cohort Study

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Prevalence of RHD in Children (Aged 5–14 years)

Carapetis, Lancet Infect Dis 2005
Prevalence of RHD in Children (Aged 5–14 years)

>345,000 deaths annually
>15 million people worldwide

Carapetis et al, Lancet Infect Dis 2005
Lozano et al, Lancet 2013
Rheumatic heart disease (RHD): a major public health problem in the developing world

• Acute rheumatic fever is an inadequate immunological response to group A streptococcal infection (sore throat)

• RHD: the consequence of repeated acute rheumatic fever attacks

• Endemic heart disease in New Caledonia
  Baroux N et al., J Paed Child Health 2013
  Mirabel et al, submitted Dec 2014

• Disease control: administration of penicillin for primary and secondary prevention

World Health Organization: active surveillance in order to detect the disease

The WHO Global Programme for the Prevention of Rheumatic Fever and Rheumatic Heart Disease 1999
Prevalence of Rheumatic Heart Disease Detected by Echocardiographic Screening

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Guidelines for RHD screening: diagnostic echo criteria

- Diagnosis echocardiographic criteria of the RHD: international consensus

*Reményi B, WHF’s criteria for echocardiographic diagnosis of RHD- guideline, Nat RevCardiol 2011*

→ Definite RHD / Borderline RHD / Normal.

But, Borderline RHD: Pathogenicity? Outcomes? Need for treatment?

There is no existing data regarding borderline lesions
Methods: Screening Methodology

Box 1 | 2012 WHF criteria for echocardiographic diagnosis of RHD

Echocardiographic criteria for individuals aged ≤20 years

Definite RHD (either A, B, C, or D):
- A) Pathological MR and at least two morphological features of RHD of the MV
- B) MS mean gradient ≥4 mmHg
- C) Pathological AR and at least two morphological features of RHD of the AV
- D) Borderline disease of both the AV and MV

Borderline RHD (either A, B, or C):
- A) At least two morphological features of RHD of the MV without pathological MR or MS
- B) Pathological MR
- C) Pathological AR

Normal echocardiographic findings (all of A, B, C, and D):
- A) MR that does not meet all four Doppler echocardiographic criteria (physiological MR)
- B) AR that does not meet all four Doppler echocardiographic criteria (physiological AR)
- C) An isolated morphological feature of RHD of the MV (for example, valvular thickening) without any associated pathological stenosis or regurgitation
- D) Morphological feature of RHD of the AV (for example, valvular thickening) without any associated pathological stenosis or regurgitation

Echocardiographic criteria for individuals aged >20 years

Definite RHD (either A, B, C, or D):
- A) Pathological MR and at least two morphological features of RHD of the MV
- B) MS mean gradient ≥4 mmHg
- C) Pathological AR and at least two morphological features of RHD of the AV, only in individuals aged <35 years
- D) Pathological AR at least two morphological features of RHD of the MV

* Congenital MV anomalies must be excluded. Furthermore, inflow obstruction due to non-rheumatic mitral annular calcification must be excluded in adults. A bicuspid AV, dilated aortic root, and hypertension must be excluded. Combined AR and MR in high prevalence regions and in the absence of congenital heart disease is regarded as rheumatic.

Abbreviations: AR, aortic regurgitation; AV, aortic valve; MR, mitral regurgitation; MS, mitral stenosis; MV, mitral valve; RHD, rheumatic heart disease; WHF, World Heart Federation.

Box 2 | Criteria for pathological regurgitation

Pathological mitral regurgitation
(All four Doppler echocardiographic criteria must be met)
- Seen in two views
- In at least one view, jet length ≥2 cm
- Velocity ≥3 m/s for one complete envelope
- Pan-systolic jet in at least one envelope

Pathological aortic regurgitation
(All four Doppler echocardiographic criteria must be met)
- Seen in two views
- In at least one view, jet length ≥1 cm
- Velocity ≥3 m/s in early diastole
- Pan-diastolic jet in at least one envelope

* A regurgitant jet length should be measured from the vena contracta to the last pixel of regurgitant color (blue or red).

Box 3 | Morphological features of RHD

Features in the MV
- AMVL thickening ≥3 mm (age-specific)
- Chordal thickening
- Restricted leaflet motion
- Excessive leaflet tip motion during systole

Features in the AV
- Irregular or focal thickening
- Coaptation defect
- Restricted leaflet motion
- Prolapse

Reményi, World Heart Federation criteria for echocardiographic diagnosis of rheumatic heart disease an evidence-based guideline, Nature Cardiovascular 2009
Critères échographiques chez les ≤ 20 ans:

**CR CERTAINE:**
- IM pathologique + ≥ 2 caractéristiques morphologiques de la valve mitrale;
- RM avec Gmoy ≥ 4 mmHg (exclusion des formes congénitales);
- IA pathologique + ≥ 2 caractéristiques morphologiques de la valve aortique;
- CR limite de la valve aortique et mitrale.

**CR LIMITE:**
- ≥ 2 caractéristiques morphologiques de la valve mitrale sans IM ni RM pathologique;
- IM pathologique;
- IA pathologique.

Critères échographiques chez les > 20 ans:

**CR CERTAINE:**
- IM pathologique + ≥ 2 caractéristiques morphologiques de la valve mitrale;
- RM avec Gmoy ≥ 4 mmHg (exclusion des formes congénitales);
- IA pathologique + ≥ 2 caractéristiques morphologiques de la valve aortique chez les patients < 35 ans (exclusion: bicuspidie, dilatation anneau aortique, HTA);
- IA pathologique + ≥ 2 caractéristiques morphologiques de la valve mitrale;

**iVI pathologique:**
- vue dans 2 incidences +
- Longueur du jet couleur: ≥ 2 cm +
- Vmax ≥ 3 m/s +
- Enveloppe complète pan-systolique.

**IA pathologique:**
- vue dans 2 incidences +
- Longueur du jet couleur: ≥ 1 cm +
- Vmax ≥ 3 m/s +
- Enveloppe complète pan-diastolique.

Caractéristiques morphologiques de la CR:

**Valve mitrale:**
- Épaississement ≥ 3 mm* du feuillet antérieur de la GVM;
- Épaississement des cordages;
- Restriction du jeu de la PVM / GVM;
- Mouvement systolique excessif du feuillet.

**Valve aortique:**
- Épaississement irrégulier ou focal;
- Défaut de coaptation;
- Restriction de(s) feuillet(s);
- Prolapsus.
Children with Borderline lesions will:
- 1/3: have unchanged valve lesions;
- 1/3: will progress towards definite RHD
- 1/3: will resolve
Objective: To describe the natural history of borderline RHD valvular lesions on echocardiogram

Endpoints:
- **Echocardiographic outcomes:**
  - Classification according to WHF criteria;
  - Severity of valvular lesions;
- We will also look at clinical events.
Methods: Settings, Study Populations

**Settings:**
- Nationwide echo-screening since 2008 in New Caledonia;  
  *Mirabel et al. Submitted, December 2014*
- Use of WHF criteria since publication (2012);
- Prospective cohort of borderline RHD children in New Caledonia (screening campaign 2012-2014).

**Participants:** 45 Children (aged 9-10) with borderline RHD driven from screening in Nouméa (capital city).

**Inclusion criteria:** borderline RHD with no secondary prophylaxis.
**Exclusion criteria:** borderline RHD under secondary prophylaxis; definite RHD.

• Parental informed consent
Thank you!

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