PREVENTION AND CARDIOLOGY IN THE PACIFIC

RACS 3rd IMD Symposium on “Global Burden of Surgical Disease”
College of Surgeons’ Garden, East Melbourne
27th – 28th September, 2012
Presentation Format

- Island Kingdom in the Pacific
- Tonga Experience with Rheumatic Heart Disease
- Evolution of MAFU SAI Project / Program
- Data to date
- Way Forward
Island Kingdom of Tonga

- 172 islands, 39 inhabited
- Geographical sea area is 362,500 sq.km
- 3 main groups of islands
- Total population is 101,134 (2006 Census), with 37% Age 14 years and under
- Homogenous pop (96% Tongans)
- Since October 2010 Tonga Government has become a democratic elected government.
Island Kingdom of Tonga

Health Services & Workforce
• 4 hospitals
  • Vaiola Hospital the referral hospital
• 13 Health centers
• 17 RH Clinics
• Per 101,134 - 40 doctors, 11 dentists, 337 Nurses

Health Indicators
• Total live births: 2697
• Infant Mortality –11 per 1000
• U5M 20 per 1000
• Immunization Rate – 100%
• % of pregnant women attending ANC – 98%
• Maternal Mortality Rate (0 - 78 per 100,000)
• Access to safe water – 97%
• Access to Health service within 1 hour – 97%
EVOLUTION OF MAFU SAI PROGRAM

Rheumatic Heart disease (RHD) – Tonga Experience
Rheumatic Heart Disease (RHD)

- Disease of the poor
- Is the leading cause of Cardiovascular disease in children and young adults in the developing world, causing significant number of deaths among this age group.
- Many cases are detected only when the disease progresses to cardiac failure.
- Affects children as young as 3 years and adults up to age of 50+ years.
- In many Pacific Islands it is the major cause of overseas referral costing up to 20% of total Health budget.
Epidemiology of RHD in Tonga

- Previous studies suggest only a moderately high prevalence
  - 1973 1055 children aged 5 – 19 were examined and found only 3 cases 2.8 per 1000.
  - 1985 in ‘Eua MO 2-stage screening of 1106 school students (70% 5 – 12 years) and found RHD prevalence of 1.8 per 1000.
  - 1986 WHO Global Program of RF / RHD surveyed 16,000 children 5 – 15 years and reported RHD prevalence of 0.7 per 1000.
  - HOWEVER, What we were dealing with at the hospital told us– “It has to be higher”.


RHD – Hospital Experience

- 15 – 20 cases for vulvular surgery per year.
- Cost of Surgery ($25,000 - $40,000) per case.
- Causes 2 -3 immature deaths (less than 40 years of age) every year.
- 1 -2 termination of pregnancy per year.
- Youngest child to have a valve replacement was 7 years old
- ? Children - Young adults incapacitated
CROSS SECTIONAL SURVEY OF 5,053 PRIMARY SCHOOL CHILDREN

October 2003 – March 2004
Help of Medical Student – Myra Hardy, Professor Jonathan Carapetis
University of Melbourne, Professor Penny and Cardiology Team from Royal Children Hospital
RHD prevalence in Tonga – 17 years later

- A cross-sectional survey of 5053 children - 31% of 17,627 Govt. Primary school

<table>
<thead>
<tr>
<th>Stage of Examination</th>
<th># of children undergoing different stages of Examination</th>
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<tr>
<td>S-1</td>
<td>3096</td>
</tr>
<tr>
<td>S-2</td>
<td>3685</td>
</tr>
<tr>
<td>S-3</td>
<td>1695</td>
</tr>
<tr>
<td>Tot #</td>
<td>8076</td>
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</tbody>
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Help of Medical Student – Myra Hardy, Professor Jonathan Carapetis University of Melbourne, Professor Penny and Cardiology Team from Royal Children Hospital
Pathological Regurgitation (WHO)

- 4 Criteria
  - Identified in at least 2 planes
  - Regurgitant jet greater than one centimetre
  - A mosaic colour jet with peak velocity >2.5m/s
  - A pansystolic / pandiastolic of the mitral and aortic valve respectively

- Severity:
  - Very mild
  - Mild
  - Moderate
  - Severe

- Any lesion crossing 2 categories of severity (very mild & mild) was grouped in the less severe category
Definition of RHD (WHO)

• MR was considered Definite RHD if there was pathological regurgitation associated with an abnormal valve morphology characteristic of carditis.
• If valve was normal then only regurgitation with mild or greater severity was considered Definite RHD.
• Very mild pathological regurgitation with normal valve morphology were labelled Borderline RHD.
• Any pathological AR was classified as Definite RHD.
• Any MS and AS were considered Definite RHD.
Study Conclusions:

- Overall 3.9% of children had definite RHD (197 new cases)
- RHD prevalence increases with age
  - 3.1% in children age 3-6 years,
  - 4.9% among 7 – 9 years old
  - 11.5 in children aged 10-15 years.
- Estimated RHD among adult Tongan is at least 8%.
Severity of Valvular lesion as % of Total

- Majority of valve lesions were mild, 90% resolved with secondary prophylaxis.
- 12 children needed open heart surgery
18 months ECHO follow-up of un-treated Confirmed RHD

- 18% of 78 Confirmed RHD had showed progression of disease 18 months later, 2005
- Need Support to set up Screening Program

**18 months follow up of Confirmed RHD by ECHOs**

- **Total**: 78
- **Improved**: 28
- **Unchanged**: 36
- **Progressed**: 14 (18%

**2008**
Commitment to the Current Program, 2008

- MAFU SAI PROGRAM
  - “Mafu” – Heart
  - “SAI” – Good
  - GOOD HEART translates to “Mafu / Heart Screening & Identification”
Class 1 screening
Class 5 and 6 screening
1000 echos in 2 weeks?! 

- Well planned and organised
- Team of nurses
- 2 experienced cardiac sonographers
- Screening echo (PLAX, SAX, AP4,5, colour/Dop)
- Normal study – paperwork only
- Abnormal study – ECG; record images; measurements and short report
COMBINED RESULTS 12 PROGRAMS
(2008 – 2012)
Prevalence of RHD over 5 years

Prevalence of RHD per 1000 by Year

2008: 72
2009: 67
2010: 43
2011: 37
2012: 48
Treatment for Screening Population

- 950 with Rheumatic heart diseases on secondary prophylaxis:
  - 90% (855) mild – secondary prophylaxis every 28 days until Age 20 years / 10 years after diagnosis
  - 9% (85 children) mod – severe valve damage – secondary prophylaxis and regular follow-up to adulthood
  - 1% severe (10 cases) – manage heart failure and valve surgery
    - 3 cases from the Screening had needed to have surgery in last 5 years
- 64/259 Borderline due for Restudy next 1 – 2 years
- 26 / 130 Congenital had been operated on.
### Valvular Heart Surgeries

<table>
<thead>
<tr>
<th>Year</th>
<th>Age &lt; 20 Yrs</th>
<th>Age ≥ 20 yrs</th>
<th>Total</th>
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<tr>
<td>2008</td>
<td>3</td>
<td>6</td>
<td>9</td>
</tr>
<tr>
<td>2009</td>
<td>4</td>
<td>5</td>
<td>9</td>
</tr>
<tr>
<td>2011</td>
<td>3</td>
<td>11</td>
<td>14</td>
</tr>
<tr>
<td>Total</td>
<td>10</td>
<td>22</td>
<td>32</td>
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### Repair of Congenital Defects

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<th>Age &lt; 20 Yrs</th>
<th>Age ≥ 20 yrs</th>
<th>Total</th>
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<td>1</td>
<td>6</td>
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<tr>
<td>2009</td>
<td>8</td>
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</tr>
<tr>
<td>2011</td>
<td>13</td>
<td>1</td>
<td>14</td>
</tr>
<tr>
<td>Total</td>
<td>26</td>
<td>2</td>
<td>28</td>
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Summary & Way Forward

- Echocardiography Screening for Rheumatic Heart Disease could be a strategy in small Island countries.
- Identify mild cases (90%) and with secondary prophylaxis arrest the progress of the disease.
- Defer Surgery in moderate to severe cases (10%) until adulthood.
- ? Eliminate RHD from Tonga
- Build Local Capacity for the Program
- Monitor Progress
- Advocate & Support Similar Program in other PICs
RHD Pacific

- Advocate for similar program in other Pacific islands:
  - Similar work in Fiji, Samoa, Cook Islands & French Polynesia.
  - Started RHD Pacific 2010 with 4 countries and 2011, 7 island countries.

- Support some PICs to host patients for open heart surgery from smaller island countries – Tonga hosted 2 patients from Tuvalu 2011
Acknowledgement

• National Support
  • Former MOH Lord Tangi
• WHF & WHO,
• NZAid, AusAid & OOH
• Australia Tonga RHD Group