Electrophysiology

Atrial Fibrillation - A midlands wide audit, how badly are we doing?

Ian Ternouth

Chairs: David Heaven & Belinda Green

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Data from:
American Heart Association
Midland Region, NZ
Taranaki DHB
The earliest description of AF as an irregular pulse is believed to have been made more than 4000 years ago, when the Yellow Emperor of China described in detail the proper examination of the pulse and associated conditions of disease.

Not exactly new...

- How much is there?
- How much do we miss?
- How well are we doing with diagnosis, treatment and management?
American Heart Association Data

Risk Factors Identified:
- Males - higher rate of prevalence
- Females - higher rate of mortality
- Developed Countries - more than twice the rate of Mortality due to AF than undeveloped
- Diabetes, Obesity

For men and women 40 years of age and older, the remaining lifetime risk for development of AF is approximately 1 in 4.
Midland Risk Factors Identified

- **Ethnicity**: Maori 1.6 times higher, Asians 0.5 rate of Other
- **Age**: 75% are less than 80 yrs old
- **Gender**: 53% Male - statistically significant
- **Rurality**: Higher rates in urban areas and urban admission rates increasing
- **Deprivation**: The very least deprived (Dep 1-2) have twice the rate, (all other deprivations no difference to each other Dep 3-10)
- **Readmissions**: significant relationship to urban and no significant relationship with ethnicity

Number of admissions and number of patients – Midland, NZ

Note. The annual average Distinct NHI is not the average of the sum of the five years, but the average of the unique NHIs over the five years. That means that a patient who was admitted more than once in separate years is displayed once in each year he/she was admitted, but only counted once in the total. Hence, the average 2011-2015 is less than the average of the sum.
Note: This analysis is based on distinct NHI (i.e. each patient is only represented once).

- Māori have the highest rate with 56 per every 10,000 Māori aged 40 year or over.
- Asians have the lowest rate with 19 per every 10,000 Asians aged 40 year or over.

Note: This analysis is based on distinct NHI (i.e. each patient is only represented once).

Interpretation:
Over the five year period 2011-2015, 71% were admitted for atrial fibrillation once.
READMISSIONS and TIMEFRAMES

SUMMARY STATISTICS OF ATRIAL FIBRILLATION READMISSIONS TO MIDLAND DHB HOSPITALS BY MIDLAND DHB RESIDENTS, 2011-2015.

<table>
<thead>
<tr>
<th>Readmissions</th>
<th>Average annual number</th>
<th>% of total admissions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Within 2 weeks</td>
<td>118</td>
<td>5%</td>
</tr>
<tr>
<td>Within 3 months</td>
<td>345</td>
<td>15%</td>
</tr>
<tr>
<td>Within 1 year</td>
<td>606</td>
<td>26%</td>
</tr>
<tr>
<td>Readmissions - detailed</td>
<td></td>
<td></td>
</tr>
<tr>
<td>0-15 days</td>
<td>118</td>
<td>5%</td>
</tr>
<tr>
<td>16-90 days</td>
<td>228</td>
<td>10%</td>
</tr>
<tr>
<td>91-365 days</td>
<td>262</td>
<td>13%</td>
</tr>
<tr>
<td>No readmission</td>
<td>1765</td>
<td>74%</td>
</tr>
</tbody>
</table>

Note: Due to rounding, the detailed table equals 28% readmitted within 1 year.

Interpretation: 5% are readmitted within 0-15 days, 10% within 16-90 days, and 13% are readmitted within 91-365 days.


READMISSIONS – TIME TREND (NO.)

Interpretation: This analysis is based on distinct NHI (i.e. each patient is only accounted for once).

Interpretation: There was a slight increase in number of patients readmitted for atrial fibrillation within 15 days, 90 days and 1 year (not statistically significant).

Readmissions – Maori/Pacific and Other – no difference

Interpretation: Ethnicity is not significant for readmissions rates - No difference between Maori/Pacific and Other regarding the number of times admitted 2011-2015.

READMISSIONS AND GENDER

Interpretation: Readmission rates after 90 days and 1 year are slightly higher for males than females (*statistically significant).
LENGTH OF STAY – Midland, NZ

Interpretation: The median length of stay is 1 day. Two thirds of patients (63%) stay 0-1 day, 18% stay 2-3 days, and 8% stay 4-5 days. In other words, 90% of all Midland atrial fibrillation patients stay 0-5 days in hospital.

RURALITY – Urban Worse off – Aged 40yrs +

Interpretation: 64% of all patients admitted for atrial fibrillation live in urban areas (n=984). The admission rate is higher in urban areas compared to rural and semi-rural areas (*statistically significant). For every 10,000 people (aged 40 years and over) living in urban areas, 46 were admitted (33 in rural areas and 25 in semi-rural areas).

DEPRIVATION LEVEL – Wealthy Worse off – Aged 40yrs +

Interpretation: There is no linear relationship between level of deprivation and admissions for atrial fibrillation. 1 = least deprived, 10 = most deprived.

DEPRIVATION LEVEL & RURALITY – excluding Dep 1 and 2 shows the urban effect is flat across remaining deprivation levels

Interpretation: This analysis is based on distinct NHI (i.e. each patient is only accounted for once).
That equals 300 people.
Taranaki Data
Atrial Fibrillation in Ischaemic CVA at TDHB

Patient Demographics

Prevalence of AF in this population

CVA with AF- CHADVASC

CVA patients on Telemetry
There are Inter and intra DHB variations

- Monitoring of CVA
- Echo
- Holters
- Event monitors
- Implantable Loop Recorders
- Wearables...

- Zero to 48 hours
- Not routine, wait lists up to 12/12
- Not routine, long wait lists, usually 24 hours only
- Better if symptoms only
- Expensive, but gold standard
- Tbc...

Ethnicity is Significant in First Admissions but not readmissions...

Māori and Pacific non-valvular AF patients are diagnosed with AF 10 years earlier than non-Māori/Pacific patients.102 Further, the prevalence of AF in Māori was almost twice that of Europeans after adjusting for age, sex, deprivation and clinical risk factors.


The future?
The ideal instrument for AF detection would be non invasive and provide real-time, accurate AF detection in a passive fashion—specifically, not requiring the user to remember to perform some action and not limited to any one snapshot in time. Smartwatches are well positioned to accomplish these goals in a cost-efficient and resource-efficient fashion.

JAMA Cardiol. Published online March 21, 2018. doi:10.1001/jamacardio.2018.0136
The deep neural network exhibited a C statistic of 0.97 (95% CI, 0.94–1.00; P < .001) to detect AF against the reference standard 12-lead ECG–diagnosed AF in the external validation cohort of 51 patients undergoing cardioversion; sensitivity was 98.0% and specificity was 90.2%. In an exploratory analysis relying on self-report of persistent AF in ambulatory participants, the C statistic was 0.72 (95% CI, 0.64–0.78); sensitivity was 67.7% and specificity was 67.6%.

Holter monitoring or ECG monitoring in hospital especially for short periods of less than 48 hours will greatly underestimate the prevalence of AF.

HOLTERS - Who does them, who reports them, who acts on them, how long for?

Yet this is the routine in New Zealand, need for increased IFA/7 day monitors and resource

Holter monitoring or ECG monitoring in hospital especially for short periods of less than 48 hours will greatly underestimate the prevalence of AF.

In one study of embolic CVA, standard ECG identified AF in 2.7% of the cases at admission (4/149 patients) and in 4.1% of remaining patients within 5 days (6/145). Holter disclosed AF in 5% of patients with a normal standard ECG at admission (7/139 patients Stroke. 2004 Jul;35(7):1647–51

ASSERT II study of 256 patients (mean age of 74 years; mean CHA2DS2-VASc score of 4.1) with an implanted subcutaneous electrocardiographic monitor who were followed for about 16 months, one or more episodes of subclinical AF lasting ≥5 minutes occurred in 34 percent Circulation. 2017;136(14):1276


Multiple studies have shown that an holter is not adequate to diagnose/rule out subclinical or occult AF.
Curing Atrial Fibrillation??

EP procedures including PVI, approximately 50 PVI done in 2017 privately in Hamilton

Applicable to a small group only but very effective (and expensive)

So in summary

- **Diagnosis**
  - Done poorly
  - Inadequate resource
  - Even those aren’t used to the best advantage
  - Wearables will help in the future

- **Treatment**
  - Often not initiated
  - Often done half heartedly
  - Warfarin issues
  - Dabigatran issues
  - Rivaroxaban ….