Primary PCI

National Audit Day
28 Nov 2012 - Wrexham

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Consultant Cardiologist, MCC
Mid & West Cardiac Network lead
Primary PCI in Wales

- Data period Apr 2011-Mar 2012
- Activity
- Timings
- Procedural technique
- Outcomes
- Length of stay
### A brief history of Primary PCI

<table>
<thead>
<tr>
<th>Year</th>
<th>Event/Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>1983+</td>
<td>Case series Safety &amp; efficacy of PPCI proposed</td>
</tr>
<tr>
<td>1993+</td>
<td>RCT’s PAMI / Zwolle “Reduced mortality &amp; re infarction and lower stroke rate with PTCA vs Lysis”</td>
</tr>
<tr>
<td>1995+</td>
<td>Early European adopters Major European centres began implementing PPCI</td>
</tr>
<tr>
<td>2003</td>
<td>Meta analyses Keeley et al</td>
</tr>
<tr>
<td>2005</td>
<td>MCC/UH daytime PPCI for local popn to 24/7 PPCI for local popn</td>
</tr>
<tr>
<td>2008</td>
<td>UK NIAP report “PPCI is desirable, feasible &amp; cost effective”</td>
</tr>
<tr>
<td>2009/10</td>
<td>Extended 24/7 to most of SWales</td>
</tr>
<tr>
<td>2010</td>
<td>PPCI now available 24/7</td>
</tr>
<tr>
<td>2011</td>
<td>WHSCC Commissions PPCI</td>
</tr>
</tbody>
</table>

**28 YEARS LATER AFTER……**

- **22 RCT’s**
- **7 Meta analyses**

Class I A ESC & AHA recommendation

Proven cost effectiveness over conventional treatment
MIINAP 2012
Reperfusion treatment for patients with a final diagnosis of STEMI

Primary PCI now makes up more than 95% of reperfusion treatment in England (51% in Wales)
BCIS Audit report 2012

Primary PCI pmp
Cardiac Networks

2010
2011

Maps and analysis: David Cunningham
Not age adjusted
## STEMI in Wales – Population estimates

<table>
<thead>
<tr>
<th>Area</th>
<th>Population</th>
<th>STEMI rate p.a*</th>
</tr>
</thead>
<tbody>
<tr>
<td>N Wales</td>
<td>700,000</td>
<td>350</td>
</tr>
<tr>
<td>Mid &amp; West Wales</td>
<td>933,000</td>
<td>466</td>
</tr>
<tr>
<td>South East Wales</td>
<td>1300,000</td>
<td>650</td>
</tr>
<tr>
<td>WALES</td>
<td>2.93 million</td>
<td>1466</td>
</tr>
</tbody>
</table>

* Predicted hospitalised STEMI rate per annum based on 2010 BCIS audit data of 500 hospitalised STEMI's per annum – ESC 2012 guidelines assume a predicted STEMI incidence of 660pmp
Regional Heart attack centre PPCI activity
Primary & Rescue PCI activity for Wales 2011/12

- **MCC**: 337 Primary PCI, 39 Rescue PCI
- **UHW**: 220 Primary PCI, 31 Rescue PCI
- **Glan Clywd**: 20 Primary PCI, 9 Rescue PCI
- **Royal Gwent**: 4 Primary PCI, 2 Rescue PCI
- **Liverpool H&C**: 18 Primary PCI, 17 Rescue PCI
Primary PCI per million population (pmp) by network

Population assumptions:
- M&W Wales 933,000
- SE Wales 1300,000
- N Wales 700,000
Primary PCI per million population (pmp) by network

- Mid & West Wales: 361
- SE Wales: 169
- North Wales: 54
- BCIS: 341

Population assumptions:
- M&W Wales 933,000
- SE Wales 1,300,000
- N Wales 700,000

BCIS overall UK PPCI rate pmp 2011 data
Primary PCI
UK Countries

PPCI Procedures pmp

Population estimates assume all Welsh to be treated in Wales.
## MINAP 2011/12

### Reperfusion by Network

<table>
<thead>
<tr>
<th>Patients having Primary PCI</th>
<th>England: Overall</th>
<th>Wales: Overall</th>
<th>North Wales Cardiac network</th>
<th>South Wales Cardiac network</th>
</tr>
</thead>
<tbody>
<tr>
<td>n</td>
<td>19139</td>
<td>528</td>
<td>16</td>
<td>512</td>
</tr>
<tr>
<td>%</td>
<td>95%</td>
<td>51%</td>
<td>64%</td>
<td>64%</td>
</tr>
</tbody>
</table>
Expansion of regional heart attack programme 2011/2012

- MCC extend to M&W Wales regional service
- UHW extend to SE Wales regional service
TIMINGS

PCI for Acute Sx
Four admission scenarios

- Admitted from the community
  - Admission to Non-PCI centre
    - Direct admission to PCI centre
    - Transfer to PCI centre
  - CTB
    - D1
    - D2
    - DTB device
PPCI Call to Balloon time (excl. shock/vent)
By Admission Route

50 minute delay

Median CTB (min)

2009
2010
2011

Direct
IHT
All

2011 data: Ludman

Better
% of PPCI cases which are Inter Hospital Transfers

% of PPCI cases which are IHT

- **MCC**: 19.8%
- **UHW**: 4.1%
- **Liverpool H&C**: 77.80%
- **BCIS**: 22.5%
DIRECT admission to PPCI centre

PCI for Acute Sx
Four admission scenarios

- Admitted from the community
  - Admission to Non-PCI centre
  - Direct admission to PCI centre
  - Transfer to PCI centre
  - D1
  - D2
  - DTB
  - device
### Timings – DTB/CTB Direct to PPCI centre

*Excluding all patients with cardiogenic Shock & ventilated patients*

<table>
<thead>
<tr>
<th></th>
<th>MCC</th>
<th>UHW</th>
<th>LHC</th>
<th>BCIS 2011 data</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Median Door to Balloon time (DTB)</strong></td>
<td>46</td>
<td>50</td>
<td>30</td>
<td></td>
</tr>
<tr>
<td><strong>% of DTB &lt; 90 minutes</strong></td>
<td>84%</td>
<td>88%</td>
<td>100%</td>
<td>Mean 91%</td>
</tr>
<tr>
<td><strong>Median Call to Balloon (CTB)</strong></td>
<td>106</td>
<td>116</td>
<td>107</td>
<td></td>
</tr>
<tr>
<td><strong>% of CTB &lt; 150 mins</strong></td>
<td>84%</td>
<td>89%</td>
<td>50%</td>
<td>Mean 81%</td>
</tr>
</tbody>
</table>
Primary PCI (excl shock/vent)

Direct ONLY: PCI Door to Balloon < 90 min
Direct & Interhospital transfers

PCI for Acute Sx
Four admission scenarios
### Timings - Direct & IHT DTB/CTB

*Excluding all patients with cardiogenic Shock & ventilated patients*

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</thead>
<tbody>
<tr>
<td><strong>Median Door to Balloon time (DTB)</strong></td>
<td>43 mins</td>
<td>-</td>
<td>30 mins</td>
<td>Mean 91.9%</td>
</tr>
<tr>
<td>% of DTB &lt; 90 minutes</td>
<td>85.9%</td>
<td>-</td>
<td>89.50%</td>
<td>Mean 80.4%</td>
</tr>
<tr>
<td><strong>Median Call to Balloon (CTB)</strong></td>
<td>108 mins</td>
<td>-</td>
<td>230 mins</td>
<td></td>
</tr>
<tr>
<td>% of CTB &lt; 150 mins</td>
<td>80.5%</td>
<td>-</td>
<td>28.90%</td>
<td></td>
</tr>
</tbody>
</table>
Primary PCI (excl shock/vent)

Direct and IHT: PCI Door to Balloon < 90 min

91.9%

Better
Primary PCI (excl shock/vent)

Direct and IHT: Call to Balloon times < 150 min

% CTB < 150 min

Better

Number of Cases

2011 data: Ludman
Primary PCI (excl shock/vent)

Direct and IHT: Call to Balloon times < 150 min

80.4%
Primary PCI 2010 v 2011

Direct and IHT: PCI Door to Balloon < 90 min
MINAP 2012 – PPCI in hospitals in England & Wales

<table>
<thead>
<tr>
<th>Year</th>
<th>2011/12</th>
</tr>
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<tbody>
<tr>
<td></td>
<td>n</td>
</tr>
<tr>
<td>England: Overall</td>
<td></td>
</tr>
<tr>
<td>Wales: Overall</td>
<td></td>
</tr>
<tr>
<td>Glan Clwyd Hospital, Rhyl</td>
<td></td>
</tr>
<tr>
<td>Morriston Hospital, Swansea</td>
<td></td>
</tr>
<tr>
<td>University Hospital of Wales, Cardiff</td>
<td></td>
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</tbody>
</table>
Primary PCI as a % of total PCI centre activity

PPCI as a % of total PCI activity

MCC UHW Glan Clywd Liverpool H&C BCIS
% of PPCI cases using DES

% of cases using DES

- MCC: 59.4%
- UHW: 45.4%
- Glan Clwyd: 35%
- LHC: 11%
- BCIS: 59.5%
% of PPCI cases using any GPIIbIIIa

% of cases using any GPIIbIIIa

MCC  UHW  Glan Clwyd  LHC  BCIS

0.0  10.0  20.0  30.0  40.0  50.0  60.0
% of PPCI cases using Bivalirudin

- MCC
- UHW
- Glan Clwyd
- LHC
- BCIS
% of PPCI cases using Prasugrel

- MCC
- UHW
- Glan Clwyd
- LHC
- BCIS
% of PPCI cases using Radial access

BCIS figure applies to all PCI’s as no PPCI specific data available
OUTCOMES
Summary: Mortality
Risk Stratified by Syndrome

In Hospital Mortality as reported (%)

- All: 1.6
- Elective: 0.18
- UA / NSTEMI: 0.61
- Primary PCI
- Rescue: 6.7

2011 data: Ludman
MINAP 2012 - Outcomes

Figure 21. 30 day mortality (with 95% confidence limits around the point estimate within each year) for STEMI in England and Wales.
Procedural success – TIMI3 flow (% of all cases)

n.b Procedural success not recorded for 20% of Glan Clwyd cases
PPCI 30 day mortality including shock & ventilated cases

30 day mortality

- MCC: 4.2%
- UHW: 3.5%
- Glan Clwyd: 5.0%
- LHC: 0%
- BCIS: 5.8%
Primary PCI (includes shock/vent)
30 day Tracked Mortality

5.8 %

Number of PPCI procedures with tracked mortality

Shock and ventilation INCLUDED
England and Wales only
PPCI 30 day mortality - Excluding Cardiogenic shock & Ventilated patients

30 day mortality

- MCC: 2.40%
- UHW: 0.50%
- LHC: 0%
- BCIS: 2.80%
Primary PCI (excludes shock/vent, direct adm only)

30 day Tracked Mortality

2011 data: Ludman

2.8%

Number of PPCI procedures with tracked data

Shock and vent excluded
England and Wales only
From DTB data all Direct admit to centre
Length of stay
Median length of stay in PCI centre
(Excludes shock & ventilated patients)

Median Length of stay (days)

<table>
<thead>
<tr>
<th>MCC</th>
<th>UHW</th>
<th>LHC</th>
<th>BCIS</th>
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<tbody>
<tr>
<td>2.0</td>
<td>4.0</td>
<td>2.8</td>
<td>2.5</td>
</tr>
</tbody>
</table>

UHW data includes CABG/ICD etc but excludes repatriated patients
PPCI Direct from Community

Median Length of stay in PCI Centre (exc shock and vent)

LOS = First device time to discharge (assuming discharge at midday)
Acknowledgments

• Andrea Beniamous / Stephen Morris – MCC
• Tim Kinnaird – UHW
• Paul Das / Richard Cowell – N Wales
Conclusions

• Regional expansion of Morriston & UHW PPCI programmes has led to a substantial increase in the PPCI activity in the S Wales cardiac network

• N Wales network continues to rely predominantly on a lysis based reperfusion service which is at odds with the UK trend

• Quality & Outcome data for both Welsh Regional PPCI programmes is in line with published national standards