Successful treatment of life threatening coronary rupture during routine PCI

DR GRAHAM CASSEL
MILPARK HOSPITAL, JOHANNESBURG
CASE ONE: 73 year old man with long history of CAD

- Presented 4 years previously with symptoms of angina and negative stress test
- Angiogram performed because of history and strong family history of coronary disease
- CTO of RCA and minor disease of LAD detected
- LVEF depressed at 40%
- Conservative treatment recommended
Follow up

- Last check-up during 2013 confirmed stable but impaired LV function; no stress induced ischemia and advised ongoing conservative approach.
- Presented again in October 2014 with recent onset angina and shortness of breath.
- Repeat angiography recommended.
- Patient agreed on condition that intervention would be percutaneous or nothing!!!
Severe chronic LV dysfunction with LVEF of 35-40%.

Unchanged since procedure years previously
Lesion in mid LAD has deteriorated since last angiogram.

Note stent in proximal circumflex of 4 years ago.
CTO of Dominant RCA
Deployment of 3.5mm X 23mm DES inflated to 18 atm
Lesion post dilated with 3.5 NC balloon with catastrophic result!!!
Coronary rupture sealed with 4.0 x 20mm Papyrus covered stent...

TIMI 2 distal flow in LAD and closure of collaterals to RCA
Immediate sealing of life threatening rupture but distal flow still sluggish... note drain in the pericardium...
Covered stent deployed and the leak is sealed. Although distal flow limited, there is patency of the distal LAD and the collateral to the RCA.
Follow Up

- Returned to ICU in stable condition
- Pericardial drain removed the next day
- Haemodynamically very stable suggesting that the flow in distal LAD and collaterals to the RCA improved overnight.
- Discharge on day 2
- 5 months later is class 1 cardiac and no angina
CASE 2: 65 year old lady presented to CCU

- Multiple coronary risk factors including non-insulin dependant diabetes and hypercholesterolemia
- Admitted with one day history of classical angina.
- ECG showed T wave inversion in lateral leads
- Troponin level 65 (normal 5-10)
- Conventional treatment of ACS with angiography planned for the following day
Severe RCA stenosis: Culprit Lesion
Mid LAD stenosis: Role to intervene?
Lesion only partially expanded
Rupture following high pressure inflation with NC balloon
Deployment of covered stent
LAD sealed by covered stent but tamponade well established!!
Complicated Pericardial Drainage

- In the emergency situation a sub xyphoid drainage was started, during the period of hemodynamic collapse.
- Arterial blood drained freely
Patient was transferred to ICU, but within minutes, the hemodynamics deteriorated rapidly.

Blood drained freely through the catheter but was now venous blood.
Emergency Surgery

- During transfer the tip of the catheter must have moved out of the pericardial space into the right ventricle and tamponade continued because of 2 holes in RV.

- Surgical drainage was considered the only option

- Entrance and exist holes through the right ventricle were identified and closed
FOLLOW UP OF CASE 2

- Surgical drainage successful and patient made uneventful recovery
- Treated with DAPT and routine therapy
- 6 months later is Class 1 and no recurrent angina
- Echocardiogram confirms excellent cardiac function
A must in every cath lab!!!

**Seal perforations with confidence**

<table>
<thead>
<tr>
<th>Orsira / PRO-Kinetic Energy stent platform</th>
<th>A well known thin strut cobalt-chromium platform with exceptional deliverability</th>
</tr>
</thead>
<tbody>
<tr>
<td>Innovative polyurethane membrane</td>
<td>Unique manufacturing method allows for an ultra thin membrane capable of sealing vessel defects</td>
</tr>
<tr>
<td>Single stent design</td>
<td>The proprietary BIOTRONIK covered single stent design enables a 58% higher flexibility and a 24% lower crossing profile*</td>
</tr>
<tr>
<td>Deliverability</td>
<td>Expect a high performing platform with an ultra thin membrane to deliver more like a conventional stent</td>
</tr>
</tbody>
</table>
Covered single stent design allows for low crossing profile and 5F guide catheter compatibility*

<table>
<thead>
<tr>
<th>Jostent Graftmaster</th>
<th>PK Papyrus 3.0/15</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.0/16 Sandwich design</td>
<td>Covered single stent design</td>
</tr>
</tbody>
</table>

Crossing profile [mm diameter]

- Jostent: 1.57
- PK Papyrus: 1.19

Guide catheter compatibility*

- Jostent: 6F
- PK Papyrus: 5F

24% reduction
High flexibility and low crossing profile for exceptional deliverability – allowing you to seal perforation with confidence.

Expect PK Papyrus to deliver like a conventional stent.

Bending stiffness of crimped stent

- PK Papyrus 3.0/15: 58% reduction
- Jostent Graftmaster 3.0/16

Track Force in coronary artery model [N]

- 53% reduction in maximum track force
- PK Papyrus 3.0/20
- Jostent Graftmaster 3.0/19
- PRO-Kinetic Energy 3.0/20
Indication: Treatment of acute coronary artery perforations

Perforation is a rare complication of PCI (0.3% of PCI)\(^1\)

Type III perforations are most severe and associated with high rate of tamponade and death:\(^2\):

<table>
<thead>
<tr>
<th>Type</th>
<th>Description</th>
<th>N</th>
<th>Tamponade</th>
<th>Emergency CABG</th>
<th>Death</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>Extraluminal crater without extravasation</td>
<td>13</td>
<td>8%</td>
<td>15%</td>
<td>0%</td>
</tr>
<tr>
<td>II</td>
<td>Pericardial or myocardial blush without contrast jet extravasation</td>
<td>31</td>
<td>13%</td>
<td>10%</td>
<td>0%</td>
</tr>
<tr>
<td>III</td>
<td>Extravasation through frank (≥ 1 mm) perforation</td>
<td>16</td>
<td>63%</td>
<td>63%</td>
<td>19%</td>
</tr>
<tr>
<td>CS</td>
<td>Perforations into an anatomic cavity chamber (CS=cavity spilling)</td>
<td>2</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
</tr>
</tbody>
</table>
CONCLUSION

- Complications occur in every cath lab
- What is important is having the knowledge and equipment to deal with these stressful situations
- Coronary rupture is fortunately extremely rare but is a reality
- I share these 2 cases to show that this potentially fatal condition can be successfully treated
Thank you and good day...