Oxygen Fires in Healthcare Facilities

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Introduction

Medical Oxygen is an essential for patient therapy in every hospital but:

– It introduces an element of risk into the hospital environment
– The risk of a fire is significantly higher when oxygen is present
– Oxygen is perfectly safe when used correctly
– Oxygen training for doctors and nurses in the correct procedures is the key to safety
– But........
What happens when it goes wrong

This incident occurred at Great Ormond Street Hospital in Central London on the 29th September 2008

- it started at 08.30 in the morning in a four bed intensive care ward in the Cardiac Wing
- Paediatric patients were being treated in this area with Berlin Heart machines – where a lot of oxygen is used
- It was all over in a matter of minutes
- and fortunately no patients were involved or hurt
What happened?

Some interesting pictures
Can you see what is wrong with these Fire Doors?

Great Ormond Street Hospital
A cylinder – typical of the one involved in the incident

Great Ormond Street Hospital
What the cylinder looked like after the incident

Great Ormond Street Hospital
What the cylinder looked like after the incident

Great Ormond Street Hospital
What the cylinder looked like after the incident

Great Ormond Street Hospital
What the cylinder looked like after the incident
What the hospital ward looked like after the incident

Great Ormond Street Hospital
What the hospital ward looked like after the incident

Great Ormond Street Hospital
With debris and shards of glass being projected over 10 metres

Great Ormond Street Hospital
What the hospital ward looked like after the incident

Great Ormond Street Hospital
The effect on the adjacent wards

Great Ormond Street Hospital
What the hospital ward looked like after the incident

Great Ormond Street Hospital
How far the wall moved after the explosion - almost a metre

Great Ormond Street Hospital
How far the wall moved after the explosion - and from the other side

Great Ormond Street Hospital
<table>
<thead>
<tr>
<th>Time</th>
<th>Event Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>08.30.00</td>
<td>Cleaner reported being in room and ‘noticing’ a burning plastic smell</td>
</tr>
<tr>
<td>08.33.05</td>
<td>Ionisation Fire Detector activated in Ward</td>
</tr>
<tr>
<td></td>
<td>Heavy smoke detected</td>
</tr>
<tr>
<td></td>
<td>Patients immediately evacuated from ward</td>
</tr>
<tr>
<td>08.34.35</td>
<td>Fire team arrive and call Fire Brigade</td>
</tr>
<tr>
<td>08.38.50</td>
<td>Evacuation of adjacent areas begins</td>
</tr>
<tr>
<td>08.42.31</td>
<td>Fire brigade arrives</td>
</tr>
<tr>
<td>08.43.40</td>
<td>Cylinder explosion in ward - after 10 minutes</td>
</tr>
<tr>
<td>08.47.00</td>
<td>Fire extinguished and area made secure</td>
</tr>
</tbody>
</table>
Incident Investigation

- Television over bed had been left on in ward – believed to be electrical fault that started incident
- Cylinders bought in by patients left in pushchairs No controls of number of cylinders in ward
- Large quantities of pipeline oxygen used with medical devices in the ward – poorly controlled
- Soft toys and combustible material present in area where oxygen was used
- Potential oxygen enrichment of soft materials
- Once started, oxygen enriched materials would burn quickly
- With proximity to patients, cylinders easily involved
Incident Investigation

• Fire believed to have started with electrical fault in television
• No clear evidence that oxygen supplied to adjacent medical device had been turned off
• Bedding and toys on bed under television had likely to have been in an oxygen enriched condition
• Toys caught fire and burned extremely quickly
• Cylinder in vicinity of fire became very hot quickly
• Failure of cylinder shell leading to massive explosion and releasing large amount of oxygen into fire
• Whole incident took only ten minutes before cylinder exploded
Lessons Learnt – Oxygen Safety

• Carry out Risk Assessments to address oxygen safety
• Provide oxygen training to all staff - covering how to use oxygen safely and minimise oxygen enrichment
• Describe the potential risks with oxygen and fires and need to keep areas clean and tidy
• Ensure equipment is used correctly and critical steps logged regularly
• Turn off the oxygen when not in use
• Always use pipeline supplies to minimise cylinders on ward
• Control the number of cylinders on the ward - especially those brought in by patients
Lessons Learnt – Fire Safety

• Ensure everyone fire training is up to date
• Provide training to staff about the potential risks with oxygen and fires
• Keep fire doors closed
• Report anything suspicious
• Make sure electrical equipment not in use is switched off
Conclusions

What are the important issues when using assessing how to use oxygen safely in hospitals

– Rate at which things burn in an oxygen environment
– Potential for high oxygen levels in the ward areas
– Oxygen enrichment of clothing / soft materials
– Amount of energy stored in cylinders
– Control of number of cylinders in ward areas
– Control the use of oxygen – turn it off when not in use
– Control of unnecessary combustible material
– Ensuring everyone is aware of the potential risks
Thank You