Spotting mistakes in infection control: 67 y.o. is admitted to the hospital....

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EUCIC Scientific Coordinator
67 y.o. patient enters the ER with abdominal pain and signs of fever

- History of urinary retention
- He/she is on vacation

H&P:

- Cirrhosis due to HCV, genotype 1b
- Liver Tx 09/1994
- Chronical renal insufficiency grade II
- History of renal cell carcinoma left pT1a cN0 cM0, G1, R0
- State after organ sparing tumor resection 07/2008
Spotting mistakes in Infection Control

- **What next?**
- **Further diagnostics?**
- **Invasive actions/diagnostics?**
• Ultrasound abdomen
MRI abdomen
• Thus, cholestasis & cholecystitis and urine retention

→ Invasive actions: ERCP and urinary catheter
What next in terms of IPC? What should you have thought of?

Risk analysis:
- Patient with previous hospitalisation
- Patient coming from abroad
- Comorbidities
- Invasive actions are needed

→ barrier precautions, antiseptic precautions, hand hygiene during invasive actions sufficient?
Disruption of natural barrier functions

→ Port of entry
→ Biofilm producers
Device-associated Infections

- Pneumonia: 87%
- LRTI: 86%
- UTI: 97%
- BSI: 97%

Total Device-related Infections: (n=19 558; 288 ICUs)

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ESCMID eLibrary
~15,000 deaths due to CAUTI
Care bundles

• Bundle = 3-5 evidence-based measures to structure and optimize the care process/invasive action

• If applied reliably and simultaneously, clinical outcome will be improved, HAI decreased
Clinically effective

Figure 2. Annual changes in the surgical site infection (SSI) rate and bundle compliance and the 95% confidence interval.
Bundles and IPC requires discipline
Care bundles – why?
Role of HCWs in ID spread

Colleagues are the most important risk factor for diseases transmission for HCWs!
Common reasons for non compliance

- “too much to do/not enough time”
- “Dispensers difficult to reach or too few”
- “ABHR irritates skin”
- “personnel shortage/not enough time”
- “patient has a low risk of carrying a pathogen/being infectious”
Real reason for low compliance
Ideas to improve compliance

- Availability of ABHR dispensers
- Positive attitude towards HH
- Be a role model (Chief/Head)
- Technical solutions (automated HH surveillance)
- Training & knowledge (5 moments etc.)
Scare them with reality
What next in terms of IPC? What should you have thought of?

Risk analysis:
- Patient with previous hospitalisation
- Patient coming from abroad
- Invasive actions are needed

→ Patient has a higher risk of being colonized with an MDRO

→ Screening performed?
Patients coming from high-prevalence areas have a higher risk to be colonized with an MDRO, especially when in contact with local healthcare institutions (OR 2.5)
Impact of colonization

- Multivariate regression analysis accounting for age, gender, diagnoses and comorbidities

Colonized patients have a significantly increased LOS (mean + 11 days, p<0.001)

Table 3: Influence of colonization status on LOS (Model 1) and Influence of specific MDRO on LOS (Model 2)

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Model 1</th>
<th>Model 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Colonized</td>
<td>1.772</td>
<td>—</td>
</tr>
<tr>
<td>Colonized trauma patients</td>
<td>2.250</td>
<td>—</td>
</tr>
<tr>
<td>VRE</td>
<td>—</td>
<td>2.882</td>
</tr>
<tr>
<td>MRSA</td>
<td>—</td>
<td>1.343</td>
</tr>
<tr>
<td>MDR–GN</td>
<td>—</td>
<td>1.738</td>
</tr>
<tr>
<td>Mild internal diseases</td>
<td>0.499</td>
<td>0.370</td>
</tr>
<tr>
<td>Internal medical diseases</td>
<td>0.727</td>
<td>0.523</td>
</tr>
<tr>
<td>Hereditary genetic disorders</td>
<td>0.920</td>
<td>0.629</td>
</tr>
<tr>
<td>Malignancies</td>
<td>0.945</td>
<td>0.679</td>
</tr>
<tr>
<td>Infection</td>
<td>1.079</td>
<td>0.783</td>
</tr>
</tbody>
</table>

*Trauma defined as reference; IRR incidence rate ratio, CI confidence interval
Impact of infection

- Infection with MDRO – Mortality
  - 1 out of 20 hospitalised patients acquires an HAI
  - 13% mortality with HAI and 2% without

- Length of Stay
  - Pat. with HAI 2.5x longer (m=11 days)

- Personell and material expenses due to isolation

- Overall costs

Mutters N.T. et al. 2015 *BMC Infectious Diseases* 15:466
Deaths due to MDRO

Cassini et al., Lancet ID 2018
• 67 y.o. patient enters the ER with **cough and signs of fever**
• He/she is on vacation

**H&P:**

- *Cirrhosis due to HCV, genotype 1b*
- *Liver Tx 09/1994*
- *Chronical renal insufficiency grade II*
- *History of renal cell carcinoma left pT1a cN0 cM0, G1, R0*
  - *State after organ sparing tumor resection 07/2008*
Spotting mistakes in Infection Control

• What next in terms of IPC?

• Risk analysis:
  – Patient coming from abroad
  – Patient has signs of a potentially transmissable disease (airborne or droplet)

• → Patient sat 4 hours in the full emergency ward

• → Clinical signs of transmissable diseases must trigger IPC measures

• → e.g. PPE AND/OR separation from other ER patients AND/OR triage AND/OR pre-emptive isolation
And you have your wildfire....

Basic reproduction rate

Assumption:

• perfect network $\rightarrow$ everyone has contact with everyone
Hospital transferal network - decentralized

Heidelberg University Hospital

Courtesy of Prof. F. Günther
Hospital transferal network - centralized

Marburg University Hospital

Courtesy of Prof. F. Günther

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But if there be any white pus on the skin of the flesh [...], the priest shall lock the patient up for seven days. If the plague be gone, and have not eaten the skin, he shall judge it clean. And he shall wash his clothes, and he shall be clean.
Questions?

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