Infections in multi-visceral transplant patients

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Introduction

• Multi-visceral Transplant (MVT): transplant of multiple abdominal viscera (stomach, small bowel, pancreas), with or without the liver
  • Full MVT: includes liver
  • Modified MVT: doesn’t include liver

• Indications
  • Acute – Catastrophic abdominal events (usually vascular)
  • Chronic – Intestinal failure

• Infection a recognised complication
1. Descriptive review

2. Changes in prophylaxis
   - Bacterial prophylaxis regime change in May 2014
     - Vancomycin and Meropenem to Tazocin
     - Duration (2 weeks) remained the same
   - CMV prophylaxis extended from 6 to 12 months
   - Fungal prophylaxis (Ambisome) remained the same
Methods

• Retrospective case series

• Inclusion criteria
  • Dates of transplant (January 1\textsuperscript{st} 2015 - December 31\textsuperscript{st} 2016)
  • Addenbrooke’s only
  • MVT only (no isolated transplants)

• Electronic medical records (EPIC\textsuperscript{®}; introduced in late 2014)

• Data collection proforma
  • Different types of infection (Viral, Bacterial, Fungal)
  • Chronology: Pre-op, Post-op (<1 month; 1-6 months; >6 months)
# Demography

<table>
<thead>
<tr>
<th>Patient population studied</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Total no. of patients studied</strong></td>
</tr>
<tr>
<td><strong>Age at operation</strong></td>
</tr>
<tr>
<td><strong>ASA score</strong></td>
</tr>
<tr>
<td><strong>UKELD score</strong></td>
</tr>
<tr>
<td><strong>APACHE II score (ICU admission post-op)</strong></td>
</tr>
<tr>
<td><strong>Outcomes (survival/death)</strong></td>
</tr>
</tbody>
</table>
Results – “Follow-up”

- 5 patients died during period of study
- 2 died into their 7th and 9th month post-op
- 1 died on 1st day post-op – not included in post-op figures

![Chart showing number of patients over time periods: Pre-op, <1 month, 1-6 months, >6 months. Numbers for each period: Pre-op 17, <1 month 16, 1-6 months 16, >6 months 14.](chart.png)
Results - Bacterial (1 – Total)

Number of patients

<table>
<thead>
<tr>
<th>Bacteria</th>
<th>Non-Blood</th>
<th>Blood</th>
</tr>
</thead>
<tbody>
<tr>
<td>MRSA</td>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td>VSE</td>
<td>9</td>
<td>6</td>
</tr>
<tr>
<td>VRE</td>
<td>10</td>
<td>3</td>
</tr>
<tr>
<td>E. coli</td>
<td>11</td>
<td>1</td>
</tr>
<tr>
<td>P. aeruginosa</td>
<td>7</td>
<td>2</td>
</tr>
<tr>
<td>K. pneumoniae</td>
<td>7</td>
<td>2</td>
</tr>
</tbody>
</table>
Results – Bacterial (2 – Resistant, Non-blood)

<table>
<thead>
<tr>
<th>Time period</th>
<th>MRSA</th>
<th>VRE</th>
<th>ESBL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre-op</td>
<td>0</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>&lt;1 month</td>
<td>1</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>1-6 months</td>
<td>1</td>
<td>5</td>
<td>1</td>
</tr>
<tr>
<td>&gt;6 months</td>
<td>2</td>
<td>5</td>
<td>1</td>
</tr>
</tbody>
</table>

Number of patients
Results – Bacterial (3 – Resistant, Blood)

<table>
<thead>
<tr>
<th>Time period</th>
<th>Number of patients</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre-op</td>
<td>1</td>
</tr>
<tr>
<td>&lt;1 month</td>
<td>1</td>
</tr>
<tr>
<td>1-6 months</td>
<td>0</td>
</tr>
<tr>
<td>&gt;6 months</td>
<td>2</td>
</tr>
</tbody>
</table>

- **VRE**
- **ESBL**
Results – Bacterial (4 - Non-resistant, non-blood)

Time period

- Pre-op
- <1 month
- 1-6 months
- >6 months

Number of patients

- E. coli
- P. aeruginosa
- K. pneumoniae
- VSE

- Pre-op: 3, 3, 2, 4
- <1 month: 9, 3, 2, 5
- 1-6 months: 5, 5, 0, 5
- >6 months: 3, 1, 3
Results – Bacterial (5 - Prophylaxis)

Prophylaxis groups (post-op)

- **Vancomycin (VRE)**: 4 (Non-Blood), 1 (Blood)
- **Tazocin (ESBL)**: 2 (Non-Blood), 0 (Blood)
- **Meropenem**: 6 (Non-Blood), 1 (Blood)

Whole cohort (post-op)

- **VRE**: 8 (Total), 2 (Non-Blood), 2 (Blood)
- **ESBL**: 3 (Total), 1 (Non-Blood), 2 (Blood)
- **Meropenem resistant**: 8 (Total), 2 (Non-Blood), 2 (Blood)
Results – Viral (Pre-op status, post-op viral loads)

<table>
<thead>
<tr>
<th>Pre-op IgG status</th>
<th>&lt;1 month</th>
<th>1-6 months</th>
<th>&gt;6 months</th>
</tr>
</thead>
<tbody>
<tr>
<td>CMV Recipient</td>
<td>5</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>EBV Recipient</td>
<td>13</td>
<td>8</td>
<td>6</td>
</tr>
<tr>
<td>CMV (PCR)</td>
<td>0</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>EBV (PCR)</td>
<td>2</td>
<td>8</td>
<td>6</td>
</tr>
</tbody>
</table>
Results – Fungal (Non-blood)

• One patient (with CF) had **Invasive Aspergillosis**
  • Isolated in blood from Pre-op and 1-6 months periods
  • Had non-blood isolate in 1-6 months period
  • Galactomannan positive in serum and BAL

• Not isolated at any point
  • PCP
  • Mucormycosis
  • Cryptococcus
  • Toxoplasma (parasite)
Results - Comparison with ‘Pre-EPIC®’ data

• 2006-2012
• 26 patients in total (7 years)
• Fewer MVT done per year than currently
• ‘Pre-EPIC®’ data not stratified in terms of ‘Blood’ or ‘Non-blood’
• Classified only into Pre-op and Post-op
  • Post-op period: 3 months, not further stratified
• Proxy for looking at effects of change in prophylaxis regime
Results - Pre-op comparison

<table>
<thead>
<tr>
<th>Bacteria</th>
<th>Pre-EPIC®</th>
<th>Post-EPIC®</th>
</tr>
</thead>
<tbody>
<tr>
<td>MRSA</td>
<td>7.7</td>
<td>11.7</td>
</tr>
<tr>
<td>VRE</td>
<td>0</td>
<td>5.9</td>
</tr>
<tr>
<td>ESBL</td>
<td>3.8</td>
<td>0</td>
</tr>
<tr>
<td>E. coli (non-ESBL)</td>
<td>7.7</td>
<td>23.5</td>
</tr>
<tr>
<td>K. pneumoniae (non-ESBL)</td>
<td>3.8</td>
<td>17.6</td>
</tr>
<tr>
<td>P. aeruginosa</td>
<td>0</td>
<td>17.6</td>
</tr>
<tr>
<td>S. maltophilia</td>
<td>3.8</td>
<td>5.9</td>
</tr>
<tr>
<td>E. meningoseptica</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>
Results - Post-op comparison

<table>
<thead>
<tr>
<th>Bacteria</th>
<th>Pre-EPIC®</th>
<th>Post-EPIC®</th>
</tr>
</thead>
<tbody>
<tr>
<td>MRSA</td>
<td>7.7%</td>
<td>6.3%</td>
</tr>
<tr>
<td>VRE</td>
<td>50%</td>
<td>37.5%</td>
</tr>
<tr>
<td>ESBL</td>
<td>26.9%</td>
<td>12.5%</td>
</tr>
<tr>
<td>E. coli (non-ESBL)</td>
<td></td>
<td>68.8%</td>
</tr>
<tr>
<td>K. pneumoniae (non-ESBL)</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td>E. meningoseptica</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td>P. aeruginosa</td>
<td>57.7%</td>
<td>37.5%</td>
</tr>
<tr>
<td>S. maltophilia</td>
<td>19.2%</td>
<td>12.5%</td>
</tr>
</tbody>
</table>
Results – Pre-EPIC® fungal data

- Antifungal prophylaxis didn’t change
- Pre-EPIC® cases:
  1. One case of invasive Aspergillosis
     - Fluconazole prophylaxis
     - Acute rejection + GvHD
  2. One case of invasive Mucormycosis
     - Micafungin prophylaxis
     - GvHD
- Both Ambisome intolerant
Conclusions (1)

- *P. aeruginosa*, VSE, VRE, *E. coli* (non-blood) prevalent post-op
  - *E. coli* and VSE develop within 1 month post-op, *E. coli* also come up >6 months post-op
  - VRE and *P. aeruginosa* peak at 1-6 months
- ESBLs and CPEs not a major problem (currently!)
- VRE:
  - Isolated in blood (>6 months in 2 patients)
  - Similar culture positive rates whether on Vancomycin prophylaxis or not
- Large number of EBV viraemias (typically >1 month post-op)
  - With 3 primary EBV viraemias
Conclusions (2 - Impact of change in prophylaxis)

• Increased number of patients:
  • *K. pneumoniae* (non-ESBL)
  • *E. coli* (non-ESBL)
  • *E. meningoseptica*

• Decreased number of patients:
  • VRE
  • ESBL
  • *P. aeruginosa*
  • *S. maltophilia*
Limitations

• No access to paper notes, EPIC® recently introduced before our data set
  • Sometimes limited pre-op data available
  • Gap in data in 2013 and 2014

• Single centre

• Small sample size with high mortality rate

• Some mismatch in pre-EPIC® and post-EPIC® categorisation

• Influence of length of hospital stay and co-morbidities uncertain
Future work

• Evaluating relationship of co-morbidity data with infection rates
• Comparing infection outcomes in full vs. modified multi-visceral transplants and in patients with different indications for MVT
• Comparing MVT infection rates with those after standard Tx
• Correlation between infection rates and rejection, PTLD and mortality
• Correlation between stay in hospital (particularly in ICU) and infection rates
• Looking at other pathogens (e.g. coagulase negative Staphylococci)
• Chasing up data from MVT that took place in 2013 and 2014
Acknowledgements

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  • Were closely involved with the care of these patients
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• Magdalene College, University of Cambridge
Many thanks for listening!

Any questions?
References


5. [https://www.asahq.org/resources/clinical-information/asa-physical-status-classification-system](https://www.asahq.org/resources/clinical-information/asa-physical-status-classification-system)