New treatments and approaches to Tuberculosis
Tuberculosis Symposium – Eastern Europe and Central Asia
RA Ministry of Health and Médecins Sans Frontières

Role of Surgery in treatment of patient with MDR/XDR pulmonary TB - Experience from Georgia

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176 M/XDR-TB patients undergoing surgical resection
July 2009 – January 2014

All treated under DOTS plus Individualized treatment regimens

Indications for Surgery

NCTBLD M/XDR committee made decision on surgery

- **General Criteria**
  - Treatment Failure
  - High Likelihood of relapse
  - Complications of TB

- **Mandatory conditions**
  - Localized lesion
  - Sufficiently healthy to tolerate surgery (British Thoracic Society guidelines used for risk assessment)
<table>
<thead>
<tr>
<th>Variable</th>
<th>Number of Patients (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean Age, years</td>
<td>32 (15-59)</td>
</tr>
<tr>
<td>Sex, male/female</td>
<td>116 (66) / 60 (34)</td>
</tr>
<tr>
<td>MDR / XDR</td>
<td>127 (71) / 49 (29)</td>
</tr>
<tr>
<td>Median # Resistant Drugs (range)</td>
<td>6 (2-10)</td>
</tr>
<tr>
<td>Retreatment Cases</td>
<td>105 (61)</td>
</tr>
<tr>
<td>Average days of M/XDR treatment</td>
<td>350 (95-693)</td>
</tr>
<tr>
<td>Bilateral Cavitary Disease</td>
<td>27 (15)</td>
</tr>
<tr>
<td>Average post-operative follow up days</td>
<td>572 (58-1950)</td>
</tr>
<tr>
<td><strong>Surgical Indications</strong></td>
<td></td>
</tr>
<tr>
<td>Treatment Failure</td>
<td>61 (35)</td>
</tr>
<tr>
<td>High likelihood of relapse</td>
<td>89 (51)</td>
</tr>
<tr>
<td>Other</td>
<td>26 (14)</td>
</tr>
<tr>
<td><strong>Surgery Performed</strong></td>
<td></td>
</tr>
<tr>
<td>Pneumonectomy</td>
<td>27 (15)</td>
</tr>
<tr>
<td>Lobectomy</td>
<td>91 (51)</td>
</tr>
<tr>
<td>Segmentectomy</td>
<td>51 (30)</td>
</tr>
<tr>
<td>Thoracoplasty</td>
<td>7 (4)</td>
</tr>
</tbody>
</table>
## Surgical Complications

<table>
<thead>
<tr>
<th>Type of Complication</th>
<th>Number of Patients (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Major Complications</strong></td>
<td></td>
</tr>
<tr>
<td>Bronchopleural Fistula</td>
<td>4 (2.3)</td>
</tr>
<tr>
<td>Empyema</td>
<td>3 (1.7)</td>
</tr>
<tr>
<td>Hemorrhage</td>
<td>3 (1.7)</td>
</tr>
<tr>
<td><strong>Minor Complication</strong></td>
<td>6 (3.4)</td>
</tr>
<tr>
<td>Wound infection</td>
<td>4 (2.3)</td>
</tr>
<tr>
<td>Dry residual cavity</td>
<td>2 (1.1)</td>
</tr>
<tr>
<td><strong>Intraoperative Deaths</strong></td>
<td>0</td>
</tr>
<tr>
<td><strong>Early Postoperative Deaths</strong></td>
<td>0</td>
</tr>
<tr>
<td>Outcomes</td>
<td># of patients (%)</td>
</tr>
<tr>
<td>-------------------------------</td>
<td>-------------------</td>
</tr>
<tr>
<td><strong>Favorable outcomes</strong></td>
<td></td>
</tr>
<tr>
<td>Cure</td>
<td>80 (79)</td>
</tr>
<tr>
<td>Treatment completed</td>
<td>9 (8)</td>
</tr>
<tr>
<td><strong>Unfavorable outcomes</strong></td>
<td></td>
</tr>
<tr>
<td>Failure</td>
<td>4 (4)</td>
</tr>
<tr>
<td>Deaths</td>
<td>4 (4) all from TB</td>
</tr>
<tr>
<td>Default</td>
<td>5 (5)</td>
</tr>
<tr>
<td>*90% for MDR-TB and</td>
<td></td>
</tr>
<tr>
<td>*79% for XDR-TB</td>
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</tr>
</tbody>
</table>
M/XDR-TB Treatment Outcomes (2011) n=380

Favorable Outcome (53%)
- Cured 39%
- Completed 14%
- Death 15%
- Failure 10%
- Default 22%

Poor Outcome (47%)

Adjunctive Surgery Protective for Poor Outcome
→ aOR 0.27 (.11-.64)

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Comparison of potential risk factors for treatment outcomes among M/XDR-TB patients undergoing adjunctive surgery

<table>
<thead>
<tr>
<th>Indicators</th>
<th>Favorable Outcome (n=64)</th>
<th>Poor Outcome (n=13)</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>BMI (kg/m²) &lt; 18.5</td>
<td>10 (16)</td>
<td>2 (23)</td>
<td>0.51</td>
</tr>
<tr>
<td>FEV₁ &lt; 2000 ml</td>
<td>6 (9)</td>
<td>1 (8)</td>
<td>0.85</td>
</tr>
<tr>
<td>Bilateral Cavity Disease</td>
<td>7 (11)</td>
<td>5 (39)</td>
<td>0.01</td>
</tr>
<tr>
<td>Prior TB Treatment</td>
<td>36 (56)</td>
<td>10 (77)</td>
<td>0.17</td>
</tr>
<tr>
<td>XDR vs. MDR</td>
<td>17 (27)</td>
<td>8 (62)</td>
<td>0.04</td>
</tr>
<tr>
<td>Mean known sensitive drugs patient receiving</td>
<td>2.8</td>
<td>1.9</td>
<td>0.05</td>
</tr>
<tr>
<td>Receiving ≥ 3 effective drugs per DST</td>
<td>38 (59)</td>
<td>3 (31)</td>
<td>0.06</td>
</tr>
<tr>
<td>Positive Pre Surgery Culture</td>
<td>9 (14)</td>
<td>10 (77)</td>
<td>0.02</td>
</tr>
<tr>
<td>Major Post Op Complication</td>
<td>3 (5)</td>
<td>3 (23)</td>
<td>0.02</td>
</tr>
</tbody>
</table>
Clinical examples of patients

After 15 months of treatment with DOTS plus

After 18 months of treatment with DOTSplus
Clinical example of treatment outcome in patient with MDR-TB

Favorable outcome of treatment without surgery. Patient was declared as cured.

The same patient has been operated 4 months after the definition of “cured” because of the pulmonary hemorrhage. AFB+ in the caseos cavity.

The same patient after 7 months from surgery.
This is how tuberculoma looks like. This sensitive TB patient has been operated 5 months after finishing the full course of treatment in DOTS program and definition “cured”
This is the surgically resected material of a 18 years old girl, who was operated 5 months after the definition of “cured” was given.
Conclusions:

• Surgery is related with the high level of favorable outcomes and small number of complications if used as a part of the treatment of patients with M/XDR pulmonary TB

• Surgery can play an important role in the treatment of patients with high level of resistance and should be used more widely in clinical practice.