How to operate on Colon Cancer

Werner Hohenberger

Chirurgische Universitätsklinik Erlangen
University Hospital Erlangen/Germany
Erlangen

Siemens

Adidas

Puma

University
Surgery for Colon Cancer

- Easy to operate – a resident‘s procedure
- Compared to rectal cancer surgery
- less spectacular
- lower reimbursement
- Consultants‘s self-assessment, frequently:
  - nowhere better, no change needed
Variability of Colon Cancer Specimens

Prof. Ph. Quirke/Leeds
Variability of Colon Cancer Specimens

Prof. Ph. Quirke/Leeds
## Colon Cancer
### Survival Stage III
#### 5-years survival

<table>
<thead>
<tr>
<th>Location</th>
<th>Survival Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Middle Franconia (n=1513)</td>
<td>54%</td>
</tr>
<tr>
<td>German Study Group (n=9329)</td>
<td>59% right c.</td>
</tr>
<tr>
<td></td>
<td>58% left c.</td>
</tr>
<tr>
<td>Erlangen (1995-2005, \ n=204)</td>
<td>79.5%</td>
</tr>
<tr>
<td>Japan (n=2808)</td>
<td>81.9%</td>
</tr>
<tr>
<td>USA („high volume centers“)</td>
<td>44.0%</td>
</tr>
</tbody>
</table>
Colonic surgery for cancer: a new paradigm

While these advances were being made in rectal cancer surgery for colonic cancer has been left untouched.

Najib Haboubi, Colorectal Disease 2003, 11; 333-334, 2009
Standardised Surgery for Colonic Cancer: Complete mesocolic excision (CME) and central ligation – Technical notes and outcome

Hohenberger W., Matzel K.E., Merkel S., Papadopoulos T., Weber K.

Colorectal Dis 2009, 11: 354-365
Colorectal Disease – twenty years on

Neill Mortensen, Editor in Chief

John Nicholls, Editor in Chief 1999–2014

„You will be interested to hear that during the journal's life the most cited paper has been ‘Standardized surgery for colonic cancer: complete mesocolic excision and central ligation – technical notes and outcome’

Hohenberger et al., 2009;11: 354-365)
Colon Cancer Surgery

Quality of Specimen Retrieval
Surgery for Colon Cancer
Complete Mesocolic Excision (CME)
Principles

**Preservation of the mesocolic plane by sharp dissection off the parietal plane (turning embryology back)**

**and**

**Regional and central lymphnode dissection with central tie of supplying arteries**
Visceral plane (mesentery)

- kidney
- aorta

Somatic (parietal) plane

- liver
- stomach
- spleen
Concept of Two Continuously Running Fasciae
The *Mesenteric* Fascia and the *Parietal* Fascia

- *Mesocolic fascia*
- *Parietal fascia*
Colon anatomy: embryology, lymphatic drainage, mesocolon

Microscopic anatomy

Mesentery

Similarity to mesorectum...

Thilo Wedel/Kiel
Courtesy
Prof. Solveig Anderson/Oslo
Categorising Quality of Specimen Retrieval

(a) Mesocolic plane  (b) Intramesocolic plane  (c) Muscularis propria plane
**MRC CLASICC trial**

5-year disease-free survival by quality of surgery score
Patients with colon cancer

Time to 5-year local recurrence by quality of surgery score
Patients with colon cancer

P-value for Logrank test = .0022
P-value for Wilcoxon test = .0018

Good & Moderate surgery
Poor surgery
Lymph Node Dissection
with central tie
of the supplying arteries
Cancer of the Ascending Colon
Optimized Lymph-Node Dissection
Lymph Node Dissection

„High tie“
Richt hemicolecotomy for Cecal Cancer
Incision of mesocolic plane to prepare ileocolic pedicle

David G. Jagelman, Cleveland Clinics
Richt hemicolecotomy for Cecal Cancer
Clamps closing ileocolic vessels; central stump appr. 5 cm

David G. Jagelman, Cleveland Clinics
<table>
<thead>
<tr>
<th>patients</th>
<th>number of lymphnodes / pos.</th>
<th>central segment</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>conventional</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>10 / 0</td>
<td>5 / 0</td>
</tr>
<tr>
<td>2</td>
<td>6 / 0</td>
<td>6 / 0</td>
</tr>
<tr>
<td>3</td>
<td>28 / 2</td>
<td>3 / 2</td>
</tr>
<tr>
<td>4</td>
<td>12 / 0</td>
<td>2 / 0</td>
</tr>
<tr>
<td>5</td>
<td>10 / 1</td>
<td>2 / 0</td>
</tr>
<tr>
<td>6</td>
<td>20 / 1</td>
<td>2 / 0</td>
</tr>
<tr>
<td>7</td>
<td>11 / 0</td>
<td>2 / 0</td>
</tr>
<tr>
<td>8</td>
<td>12 / 1</td>
<td>7 / 0</td>
</tr>
<tr>
<td>9</td>
<td>14 / 0</td>
<td>6 / 0</td>
</tr>
<tr>
<td>10</td>
<td>25 / 0</td>
<td>9 / 0</td>
</tr>
<tr>
<td>11</td>
<td>7 / 0</td>
<td>6 / 1</td>
</tr>
</tbody>
</table>
# Transverse Colon Cancer

**Lymph Node Involvement**

<table>
<thead>
<tr>
<th>Transverse colon</th>
<th>Stage III</th>
<th>gastro-epiploic</th>
<th>infra-pancr.</th>
</tr>
</thead>
<tbody>
<tr>
<td>right p. and hepatic flexure (n=16)</td>
<td>n= 6</td>
<td>n=1</td>
<td>-</td>
</tr>
<tr>
<td>middle part (n=26)</td>
<td>n=11</td>
<td>n=2</td>
<td>n=5</td>
</tr>
<tr>
<td>left p. and splenic flexure (n=4)</td>
<td>n= 1</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>
Small arteries from middle colic a. to transverse pancreatic a. inside the pancreas
## Surgery for Colon Cancer

### Complete Mesocolic Excision (CME)

#### Postoperative Complications

<table>
<thead>
<tr>
<th>Condition</th>
<th>Count</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>postop. morbidity</td>
<td>133/633</td>
<td>21.0 %</td>
</tr>
<tr>
<td>anastomotic leak</td>
<td>11/610</td>
<td>1.8 %</td>
</tr>
<tr>
<td>reoperations</td>
<td>25/633</td>
<td>3.9 %</td>
</tr>
<tr>
<td>in hospital mortality</td>
<td>21/633</td>
<td>3.3 %</td>
</tr>
</tbody>
</table>

Chirurg, Univ.-Klinik Erlangen, 2005-2011

emergencies included
Surgery for Colon Cancer
Complete Mesocolic Excision (CME)
Cancer related Survival

- Stage I: 100 %
- Stage II: 91.3 % (88.5 – 93.9)
- Stage III: 79.5 % (73.8-85.2)

Chirurg, Univ.-Klinik Erlangen, 1995-2005, R0
Is the benefit of adjuvant chemotherapy in colon cancer presently overestimated?

L. Pahlman, W. Hohenberger, K. Matzel
K. Sugihara, P. Quirke, B. Glimelius

Colon Cancer Surgery

- Needs profound knowledge of embryology and anatomy
- Plane preservation during dissection is essential
- Is vessel oriented surgery with most central tie of supplying arteries