Novel Approaches to Transanal Surgery

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Cutting-Edge Colorectal Surgery

• There are a lot of cutting edge techniques in colon and rectal surgery:
Robotic Surgery
Transanal Surgery

- Lesions in the low rectum have been approached transanally for centuries.
Why Local Excision

• Avoids the morbidity of radical surgery
• Could potentially cure cancers that are truly localized to the bowel wall
• Some patient with tumors seemingly localized to the bowel may die from cancer even after radical surgery
Consequences of Radical Resection (TME)

- Operative mortality
- Surgical complications
- Permanent stoma
- Bowel, urinary, sexual dysfunction
- Long term complications
  - bowel obstruction
  - incisional hernia
Operative Mortality 
after Local Excision (LE) and Radical Resection (TME) 
for Stage I Rectal Cancer

Main issue has always been reaching higher lesions (>7-8 cm) with conventional transanal approaches
Difficulties with High Tumors

I was able in two cases to push the tumor down by exerting a strong pressure on the abdomen. The tumor protruded into the rectum; however, I was able in these cases to palpate the lower surface only. I decided in both cases to try an operation under pressure from the patients whose complaints were very significant, in spite of the fact that one patient, in addition to carcinoma of the large bowel, suffered from severe emphysema, and the other patient suffered from massive albuminuria of 12 years duration. The difficulties were tremendous. In spite of extensive anterior and posterior raphé incision and in spite of the extirpation of the coccyx, I succeeded with tremendous effort and mostly in the dark and under control of the fingers, to mobilize the tumor and move the bowel forward so that the tumor could be amputated. The peritoneum in both cases was opened in situ, and there was a wall of the bowel free by a small finger width. There was a significant loss of blood during both operations. Both patients died—the only operative deaths that I could complain about within the last year when I performed nine extirpations of the rectum in which only once the peritoneum was not opened. One patient (with emphysema) died from hypostatic pneumonia in spite of good wound healing. The patient died on the sixth postoperative day. The other patient died from peritonitis. I have a

Paul Kraske

DCR, 1984
Transacral approach

Therefore, I decided to try on a cadaver, if it would be possible through partial resection of the sacral bone to pave the way to the highest part of the rectum. I thought that the approach to the large bowel, which in the upper part is situated completely to the left of the midline, by the removal of the lowest part of the left wing of the sacral bone could be made easier. I performed the operation on the cadaver in the following way: I made an incision with the cadaver lying on the right side in the midline from the middle portion of the sacral bone to the anus. I detached the gluteal muscles at their insertion at the lowest portion of the left wing of the sacral bone, cut and excised the sacral bone and separated the lowest part after expanding the outer margin of the wound, the ligaments tubersacral and the underneath ligament, the spino-sacral close to the attachment of the sacral bone.

Year: 1884
2 patients
Both survived
(One with a rectocutaneous fistula)
Transacral approach – still problematic!

Table 1. Results of Kraske’s procedure for rectal lesions

<table>
<thead>
<tr>
<th>Author</th>
<th>Year</th>
<th>No. PATIENTS</th>
<th>POST-OPERATIVE MORTALITY</th>
<th>FISTULA DEVELOPMENT</th>
<th>RECURRENCE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wilson S.E. et al</td>
<td>1969</td>
<td>20</td>
<td>0</td>
<td>4 (20%)</td>
<td>1 (5%)</td>
</tr>
<tr>
<td>Armand J.P. et al</td>
<td>1978</td>
<td>11</td>
<td>0</td>
<td>3 (27,3%)</td>
<td>0 (0%)</td>
</tr>
<tr>
<td>Christiansen J.</td>
<td>1980</td>
<td>17</td>
<td>0</td>
<td>2 (11,7%)</td>
<td>2 (11,8%)</td>
</tr>
<tr>
<td>Sweeney W.B. et al</td>
<td>1991</td>
<td>11</td>
<td>0</td>
<td>0 (0%)</td>
<td>1 (9%)</td>
</tr>
<tr>
<td>Harvey E. et al</td>
<td>2003</td>
<td>30</td>
<td>0</td>
<td>1 (3%)</td>
<td>1 (3%)</td>
</tr>
<tr>
<td>Terkivatan T. et al</td>
<td>2004</td>
<td>57</td>
<td>0</td>
<td>5 (9%)</td>
<td>2 (3,5%)</td>
</tr>
<tr>
<td>Onaitis M. et al</td>
<td>2006</td>
<td>22</td>
<td>0</td>
<td>4 (17%)</td>
<td>2 (8,3%)</td>
</tr>
<tr>
<td>Present serie</td>
<td>2007</td>
<td>24</td>
<td>1 (4.8%)</td>
<td>2 (12%)</td>
<td>1 (4.3%)</td>
</tr>
</tbody>
</table>

ANNALS OF GASTROENTEROLOGY 2010, 23(3):302-306
Gerhardt Buess - Inventor of TEM - Transanal Endoscopic Microsurgery

1982 One century later another German put an end to the transacral approach
Transanal Video Surgery (TEM/TAMIS)

- **Definition**
  - MIS technique that allows the surgeon to access the mid and upper rectum to remove lesions locally without having to make an incision in the abdomen.

- **TEM** was introduced by Dr. Buess from Germany in early 1980s who developed the technique with Richard Wolf.
Indications of Parks

- Large sessile adenomas and early rectal cancers located in the lower 1/3 of the rectum
Indications for Transanal Video Surgery

- Lesions in the lower, middle, and upper rectum
  - Large sessile adenomas
  - Adenomas containing focal adenocarcinoma (Tis)
  - T1 adenocarcinoma with favorable features
  - Palliative surgery - any stage
T1 Rectal Cancer

- What is the recurrence rate after LE or TEM of T1 tumors?
- If a T1 cancer treated with LE/TEM recurs what are the chances of performing salvage surgery?
- Survival of LE/TEM vs radical surgery
<table>
<thead>
<tr>
<th>Author/Year</th>
<th>N Local/Radical Resection</th>
<th>% Local Recurrence</th>
<th>% 5year Overall Survival</th>
</tr>
</thead>
<tbody>
<tr>
<td>Heintz 1998</td>
<td>46/49</td>
<td>30/0**</td>
<td>79/81</td>
</tr>
<tr>
<td>Mellgren 2000</td>
<td>69/30</td>
<td>18/0</td>
<td>72/80</td>
</tr>
<tr>
<td>Nascimbeni 2004</td>
<td>70/74</td>
<td>6.6/2.8</td>
<td>72/90*</td>
</tr>
<tr>
<td>Paty 2005</td>
<td>151/168</td>
<td>15/3*</td>
<td>89/93</td>
</tr>
<tr>
<td>Endreseth 2005</td>
<td>35/256</td>
<td>12/6*</td>
<td>70/80*</td>
</tr>
</tbody>
</table>

* = statistically significant  ** = high risk T1
T1 Randomized Study

- TEM: 24 pts
- AR: 26 pts

MORTALITY: 0

LOCAL RECURRENCE:
- TEM: 1
- AR: 1

SURVIVAL: 5 yrs, P=NS

Postop outcomes in favor of TEM

Problems: no risk stratification; low numbers

Winde, DCR, 1996
**T2 Cancer Retrospective Data**

*Mellgren et al, DCR 2000*

<table>
<thead>
<tr>
<th></th>
<th>LR</th>
<th>OR</th>
<th>OS</th>
</tr>
</thead>
<tbody>
<tr>
<td>LE (39)</td>
<td>41%</td>
<td>47%</td>
<td>65%</td>
</tr>
<tr>
<td>RS (123)</td>
<td>6%*</td>
<td>16%*</td>
<td>85%*</td>
</tr>
</tbody>
</table>

*= stat significant compared with LE*
Is salvage surgery of recurrent rectal cancer after transanal surgery feasible?

- 50 patients underwent attempted salvage surgery after LE for T1 and T2 cancers
  - Salvage surgery possible in 49 pts
  - 55% required extensive surgery with en bloc resection of other organs (sacrum, bladder, nerves)
  - Recurrence rate after salvage 29%
  - 5 year DFS 53%

Weiser et al, Dis Colon Rectum 2005
TAMIS – A Flexible Solution

- Transanal minimally invasive surgery (2009)
- Same approach as TEM but using conventional laparoscopic equipment
TAMIS for Rectal Carcinoid
Evolution

1900

1980s

2010
## TEM vs TAMIS

<table>
<thead>
<tr>
<th></th>
<th>TEM</th>
<th>TAMIS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pt positioning</td>
<td>6 o’clock from camera</td>
<td>Less important</td>
</tr>
<tr>
<td>Instruments</td>
<td>Curved and straight</td>
<td>Curved and straight</td>
</tr>
<tr>
<td>Anal dilatation</td>
<td>3 fingers</td>
<td>2-3 fingers</td>
</tr>
<tr>
<td>Staff training</td>
<td>Special training needed</td>
<td>Conventional LAP training</td>
</tr>
<tr>
<td>Apparatus</td>
<td>Fixed</td>
<td>Flexible (rotate, reposition)</td>
</tr>
<tr>
<td>Camera Exchanges</td>
<td>Slow</td>
<td>Quick</td>
</tr>
<tr>
<td>System repositioning</td>
<td>Rare</td>
<td>Often</td>
</tr>
<tr>
<td>Rectal wall protection</td>
<td>Yes</td>
<td>Poor</td>
</tr>
<tr>
<td>Cost</td>
<td>Capital purchase</td>
<td>Single use-readily available</td>
</tr>
</tbody>
</table>
Anesthesia

• Recommend general anesthesia for most patients

• Spinal/epidural anesthesia also an option for high risk patients
Conventional TEM Preparation

IMPORTANT:
Operative field should always be at 6 o’clock
Positioning

1. **Supine position** – posterior tumor

2. **Right or left lateral decubitus position** – tumor located on right or left wall of rectum

3. **Prone position** – anterior tumor
• Position camera at 12 o'clock tumor at roughly 6 o'clock
• Gentle dilatation, insertion
• Insufflate to 15 mmHg, up to 25 mmHg in needed
• Mark resection line with cautery
• Full thickness vs submucosal resection
  – Sealing device vs monopolar cautery
TAMIS Tips

- **Insufflation** – carbon dioxide is insufflated to enlarge the intrarectal space to ensure proper resection. Flapping of the rectum can occur with inadequate insufflation-increase.

- **Resection** – grasp tissue near base of the tumor to apply tension to the mucosa. Partial mesorectal excision possible with energy source like curved ligasure advance.

- **Extraction** – extract specimen in one piece for best histological findings, together with SILS apparatus.

- **Practice your suturing before**
Specimen Orientation
Complications

Beware of the anterior rectum

Dehiscence can cause peritonitis

Always consent pt for possible laparoscopy
Complications

Perirectal abscess

Abscess

Drainage into the rectum
Complications

Dehiscence of suture line with bleeding and inflammation

Bleeding
Postoperative Management

- Pt can be discharged home
- If peritoneal perforation occurred admission recommended, close observation
- Delayed pain with mild bleeding postop occurs 10-20% - suture line disruption/abscess
  - Treat with antibiotics, pain management, reassurance
  - Fever, severe pain, severe bleeding mandate CT scan/endoscopy
  - In extreme cases temporary diversion may be needed
• Posterior dissection of the mesorectum by CO2 can result in MASSIVE retropneumoperitoneum for a few days.
• Often confused by radiologists for “free air”
• Transanal total mesorectal excision (TME)
• Transanal treatment of complications
• Possible other directions?
Latest Evolution – Radical Surgery

- Transanal dissection of the entire or the distal rectum
- Transanal TME
- TAMIS-TME
- TEM-TME
- Usually laparoscopic assisted
Why Transanal TME (taTME)

Dissection of Low Rectum is Difficult

Greater difficulty in Male Obese patients

Higher Risk of Margin Positivity Conversion
Trans-anal LAR Using TEM
Sylla P, Rattner DW, Delgado S, Lacy AM

• 1st Clinical Case
  – 76 year old F
  – uT2N2M0 Rectal Ca
• TEM & Lap Multi-port Assistance
  – Cephalad TA-TME dissection
  – Transected at level of left colon with high ligation of IMA / IMV
  – End to end anastomosis & diverting ileostomy
• Ileostomy reversal after adj chemo
• NED 3-year follow up

Surg Endo 2010 24:1205 - 1210
Transanal TME (taTME): Surge In Investigative Publications

Animal Model
- Trunzo JA et al. *Surg Innovation* 2010
- Sylla P et al. *Surg Endo* 2010
- Fajardo AD et al. *Surg Endo* 2010

Human Cadaveric Model
- Denk PM et al. *Gastro Endo* 2008
- Fajardo AD et al. *Surg Endo* 2010
- Bhattacharjee HK et al. *JLAST* 2011
- Telem Da et al. *Surg Endo* 2012
- Five patients with node negative rectal cancer
- 4-12 cm from anal verge
- Mean OR time 274 min
- Partial Intersphincteric resection in 3
- LOS 5.2 days
- 2 cases of urinary dysfunction

Anastomotic bleeding
Control of anastomotic hemorrhage with TAMIS
Robotic Transanal Surgery?
Conclusion

- Transanal approach to rectal pathology is not new
- Technology and innovative thinking continue to allow for new approaches
- Further advances on the horizon