The Application of Special Instruments with the Bioabsorbable Anastomosis Ring: Technology and Technical Aspects

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Introduction

One of the most important advantages of compression anastomoses in the gastrointestinal tract is their high level of standardization. Here we describe the creation of such a typical “standardized” anastomosis using a bioabsorbable ring (Table 1), with emphasis on devices that are necessary and currently available, and on how to use them (Table 2).

In brief, the anastomosis is created as follows: The first step in every bioabsorbable ring anastomosis is the creation of a purse-string suture on each of the intestinal parts to be anastomosed. Then the appropriate ring is inserted into the more easily accessible bowel end and the first pursestring is tied. After replacement of the plastic inserter provided against a special fixation clamp, the anastomosis is completed in an analogous manner. The ring is then closed after a final examination.

Pursestring Suture

The pursestring suture is very important for proper creation of a bioabsorbable ring anastomosis. In contrast to a stapler anastomosis, where the suture is necessary only until the anastomosis is completed, with the bioabsorbable ring it is important until the anastomosis healing is complete. Thus the pursestring suture is a factor which guarantees the stability of the anastomosis for the first week. Therefore, mistakes in its creation must lead nearly automatically to an insufficiency.

After usual preparation of the bowel ends intended for anastomosis, in small bowels the pursestring suture can be performed easily and quite reliably using a commercial pursestring clamp. A single-strand, absorbable suture of 2.0 thickness is recommended. Using this device, an end-to-side or side-to-side anastomosis can also be established very quickly by fixing the bowel wall tangentially.

To date it is not possible to make a definitive statement about the applicability of the pursestring suture clamp in the stomach. The number of gastroenteral anastomoses that have been performed with a bioabsorbable ring is still too small. In our clinic we favor an over-and-over suture done by hand.
Table 1. Technical procedure of compression anastomosis with bioabsorbable ring

1. Pursestring suture (single-strand, absorbable suture of 2.0 thickness)
   - Large bowel: after resection of the redundant mucosa continuous whipstitch suture by hand; distance between the stitches 3–4 mm, to the end of bowel 2–3 mm
   - Small bowel: continuous suture using a pursestring instrument
2. Application of three holding sutures 120° apart – alternatively Ellis clamps
3. Selection of the appropriate ring by measurement of the
   - Diameter of the bowel end to get the external ring diameter (25, 28, 31, 34 mm)
   - Thickness of bowel wall to get the compression zone (1.5, 2.0, 2.5 mm)
4. Insertion of the ring into the more easily accessible bowel end with the plastic inserter provided and tying of the first pursestring suture
5. Resection of redundant mucosa if the pursestring instrument is used
6. Replacement of the plastic inserter by a special fixation forceps
7. Completion of the anastomosis in analogous manner by inserting the ring into the second bowel end
8. Checking before closing the anastomosis ring:
   - Deficient pursestring suture?
   - Still redundant mucosa?
   - Serosal lesion?
   - Torsion?
9. Closing of the BAR with careful pressure using 2–4 fingers
10. Checking after closing (see point 8)
11. Possibility of extra support:
   - Atraumatic sero-serosal suture
   - Fibrin glue
   - Covering with epiploic appendages or peritoneum

Table 2. Technical devices for anastomosis with bioabsorbable ring

<table>
<thead>
<tr>
<th>Description</th>
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<tbody>
<tr>
<td>Pursestring clamp</td>
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<tr>
<td>Device for measuring tissue</td>
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<tr>
<td>Device for extending and measuring diameter</td>
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<tr>
<td>Plastic inserter with removable bioabsorbable anastomosis ring</td>
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<tr>
<td>Special ring fixation forceps:</td>
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<tr>
<td>- straight version</td>
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<tr>
<td>- bent version</td>
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For large bowels the current commercial pursestring suture devices cannot be recommended because none of them seizes all parts of the bowel wall equally. Therefore, the pursestring suture should be created by hand in this case as well, after resection of the redundant mucosa. The first stitch is made from the outside to the inside through the whole bowel wall (see Fig. 1), the others from the inside to the outside as whipstitches till the pursestring is completed. The distance between the stitches should be