

Colorectal Anastomosis

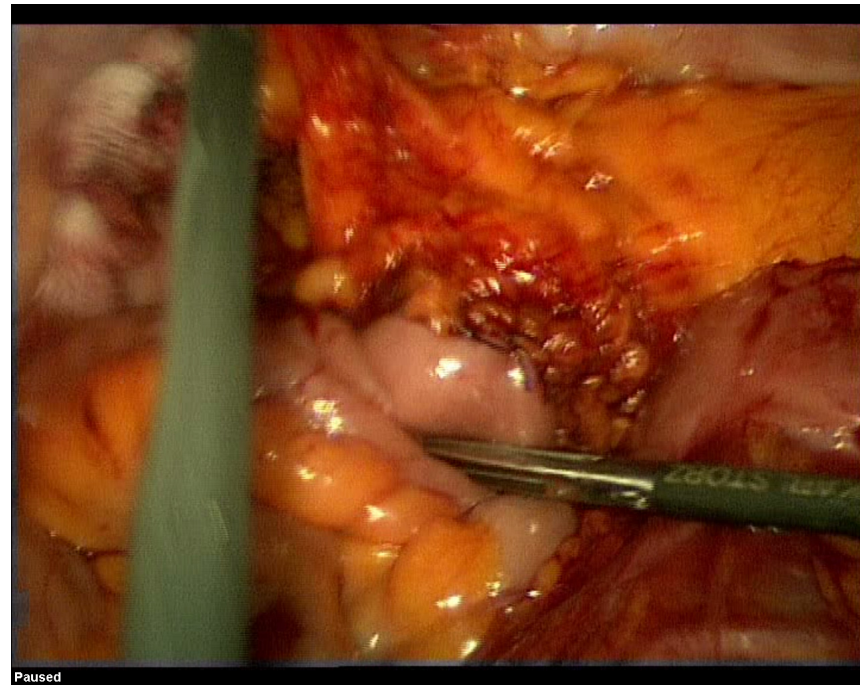
Hand Sewn

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Intestinal anastomosis

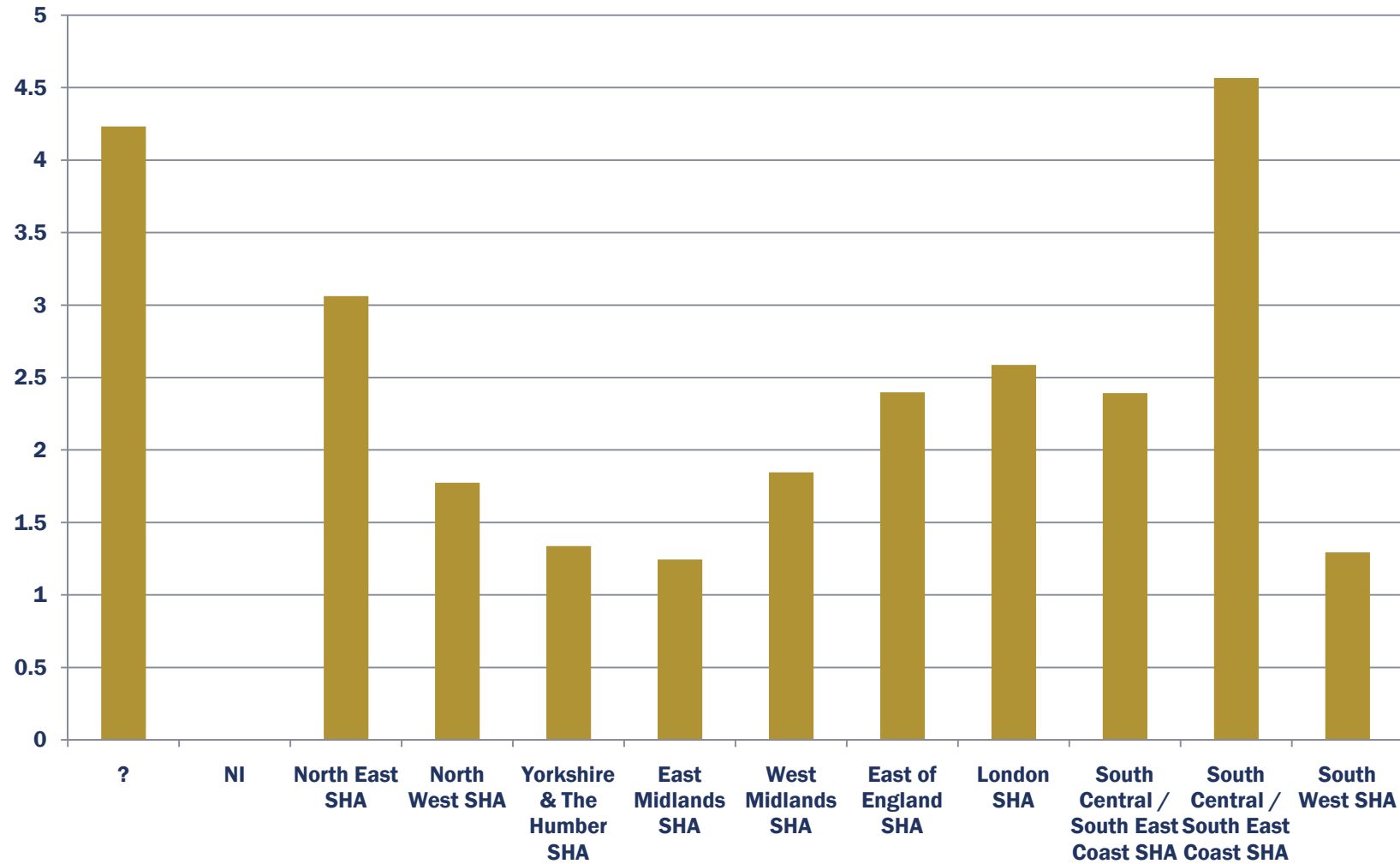
- the basic principles: crucial
 - ◇ Accurate approximation of the bowel
 - ◇ No tension
 - ◇ Good blood supply
 - ◇ 'Clean'
 - ◇ Appropriate use of defunctioning



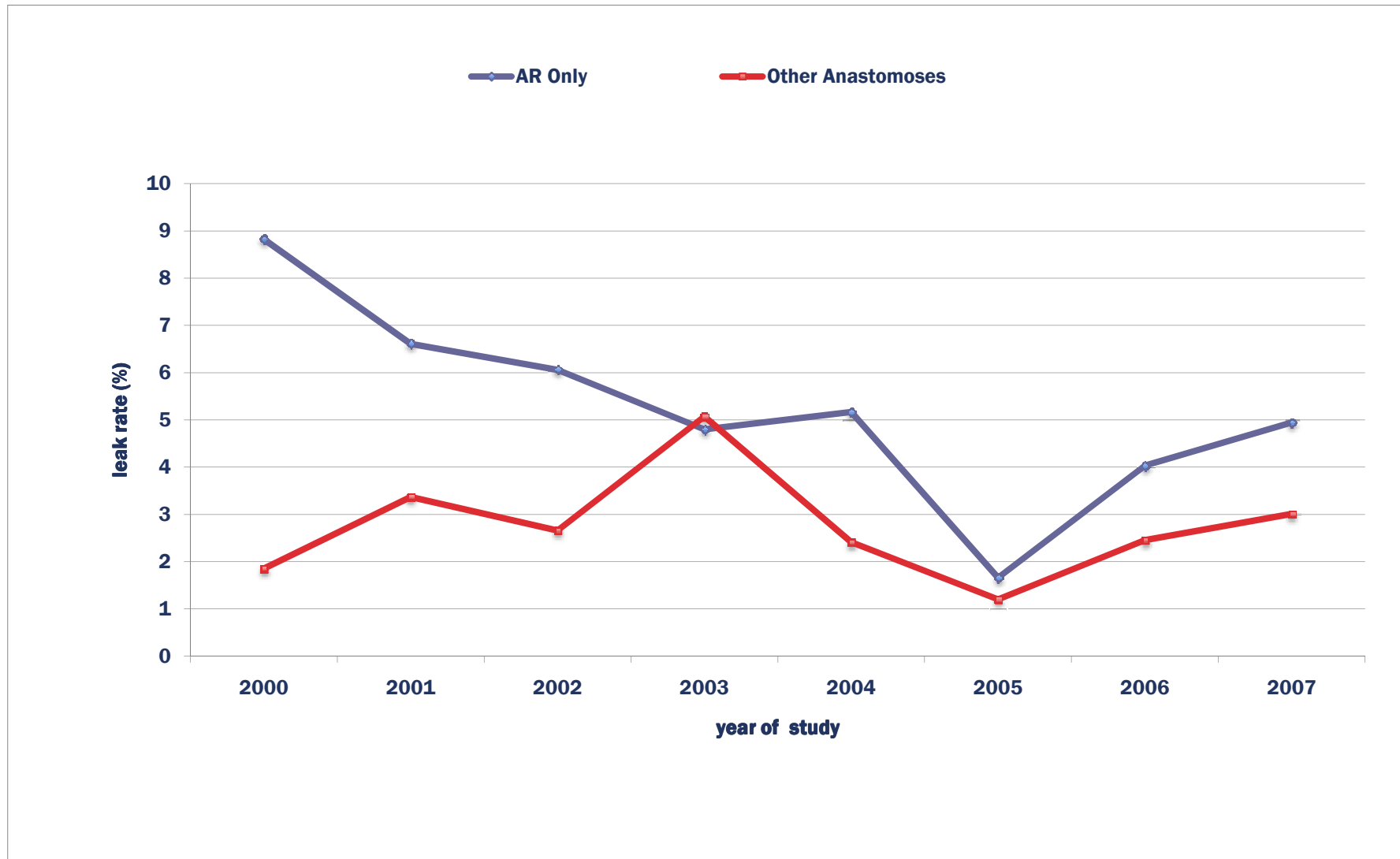
Principles of Successful Intestinal Anastomosis

- Well-nourished patient with no systemic illness
- No contamination
 - ◇ in the gut
 - ◇ in the peritoneal cavity
- Adequate exposure and access (?lap surgery)
- Well-vascularized tissues
- Absence of tension at the anastomosis
- Meticulous technique
 - ◇ (“it will be alright” never will be!!)
- Surgeon Factor – everyone has varying leak rates

Leak rates by region



Rectal and colonic anastomoses



Intestinal anastomosis healing

- Submucosa: strongest component of the bowel wall
- Collagen: single most important molecule for determining intestinal strength
- The bursting pressure of anastomoses
 - ◇ 60% of the strength of the surrounding bowel by 3 to 4 days.

Suturing : technical issue

■ Choice of suture material

- ◇ inflammatory reaction by FB
- ◇ No difference in anastomosis between absorbable and nonabsorbable
- ◇ prolene, dextron, catgut: similar inflammation
- ◇ Silk: more cellular reaction
- ◇ The ideal suture material(5-0 stainless steel)
 - minimal inflammation, maximum strength
- ◇ monofilament vs coated braided sutures
advance

Failure of anastomosis

Contributing Factors

Anastomotic failure

■ Anastomosis failure (leak) rate

- ◇ 1.5~2.2% (small bowel)
- ◇ 3% colon, 5% rectum (Smith – NBOCAP 2009)
- ◇ X3 higher in Crohn's (Tekkis meta-analysis, DCR 2007)
- ◇ Type of anastomosis (stapled/hand sewn)
- ◇ Configuration
- ◇ Emergency or elective procedure (x1.5)
- ◇ Time??
- ◇ increase morbidity & mortality (x10), double the length of hospital stay

Type and location of anastomosis

■ Location

- ◇ Rectum > Colon
- ◇ L1/3 > M1/3 Rectum
- ◇ SB & colon?

■ Type

- ◇ HS end-end best for propagation of myoelectric waveform

Patient preparation

- Nutrition - good
- Anaemia - bad
- Antibiotics - good
- Bowel Prep – bad
 - ◇ Phosphate enema!

Associated disease and systemic factors

■ Co-morbidity

- ◇ An, DM, Immunosuppression, Radiotherapy, malnutrition with hypoalbuminemia, vitamin deficiency

■ Crohn disease

- ◇ Risk of anastomotic dehiscence(12%)

■ Steroids

- ◇ ↓protein turnover, ↓wound healing, ↑sepsis

■ Blood Loss, recent transfusion

■ Obstruction

Laparoscopic surgery leak rates

Left sided anastomoses

■ Univariate analysis

- ◇ Rectum > colon
- ◇ ↑ operating time
- ◇ Number of stapler firings
- ◇ ↑ diameter of circular stapler

■ Multivariate

- ◇ L > M > U rectum
- ◇ Men + L rectum + ↑ firings = bad news!

Kim J Am Coll Surg,2009

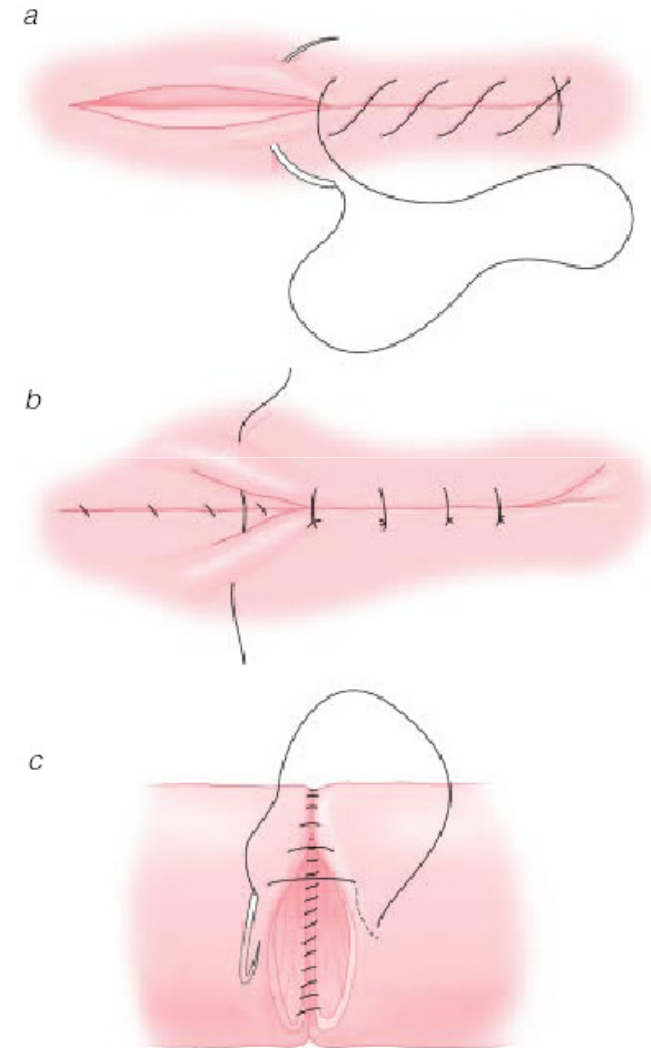
Evidence?

Inversion vs. eversion

- A 1969 study - greater anastomotic strength, less luminal narrowing, and less edema and inflammation with everted small intestinal anastomoses in dogs.
- Subsequent laboratory and clinical studies have not confirmed these findings and, have often shown opposite results
- Another argument in favour of inversion -looks neater!
- No risk of pseudomyxoma or increased adhesion in everted edges

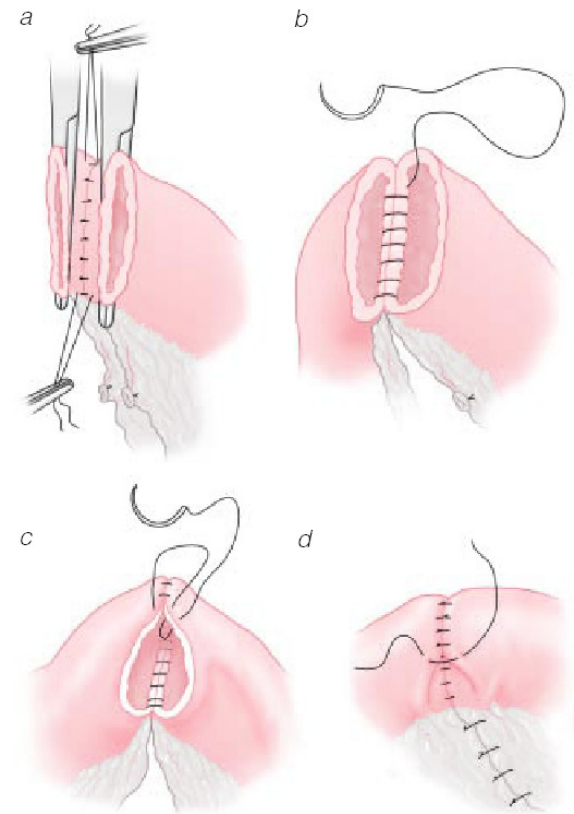
Continuous versus Interrupted Sutures

- No RCT shows an advantage between either
- Retrospective reviews have not shown any advantage either



Single-Layer vs Double-Layer Anastomoses

- Traditionally Double-layer anastomoses have been considered more secure
- The single-layer technique has significant inherent advantages
 - ◇ take less time to create
 - ◇ cause less narrowing of the intestinal lumen
 - ◇ foster more rapid vascularization and mucosal healing,
 - ◇ increase the strength of the anastomosis
 - ◇ improved postoperative return to normal bowel function
 - ◇ nonrandomized studies of anastomotic leakage rates: no differences between single- and double-layer anastomoses
- double-layer anastomoses
 - ◇ when the tissues are very edematous or friable
 - ◇ under minimal tension
 - ◇ lie in highly vascular areas (e.g., the stomach).
- Meta-analysis 2006: no difference in leak rates, increased op time (Shikata et al *BMC Surgery* 2006, 6:2)



Hand Sewn vs. Stapled Anastomosis

Various prospective, randomized trials

- no differences in clinical and subclinical leakage rates, length of hospital stay, or overall morbidity.
- no significant differences were apparent between stapled and hand-sewn anastomoses (600 pts each group).
- ...except, stenosis rates are higher in stapled procedures
- possible reduction in anastomotic recurrence rate with stapled
- Increased time with hand sewn

Sao Paulo Med J/Rev Paul Med 2002;120(5):132-6

Hand Sewn vs Staple in Pouch Patients

- 2699 hand sewn, 1485 stapled IPAA
- Slightly higher seepage rates in hand sewn
- No difference in frequency, antidiarrhoeal meds, leaks etc
- Slightly higher dysplasia in ATZ in stapled

*Lovegrove, Tekkis **Annals of Surgery** • Volume 244, Number 1, July 2006*

Nasogastric decompression

- No evidence

Abdominal drain

- No evidence

Wiggers Colorectal Disease 2005, 8, 259–265

Conclusions???

Conclusions

■ Emergency surgery

- ◇ Anastomosis is safe if patient status is satisfactory.
- ◇ Leak rate increases in unstable, malnourished, multi transfused & severe contamination.

■ Minimal number of firings in lap surgery

■ HS confers no advantage over stapled

■ Crohn's – side to side is better??

■ HS == Stapled (location)

■ Defunction

■ Good surgical technique is important!

Techniques today

- Simple interrupted (End to side)
- Continuous inverted (Connell)
- Parachute Anterior Resection