REFERENCES FOR INTRAOPERATIVE LEAK TESTING OF COLORECTAL ANASTOMOSES

   “After the anastomosis is completed, a gentle infusion of 200 to 300 milliliters of saline and antibiotic solution will leak through any defect present in the suture line and certainly make repair quite easy.”

   “The demonstration of air leakage enables immediate repair of the anastomosis perhaps avoiding subsequent clinical leakage.”

   “From our study we would recommend a distending pressure of 25 cm saline…Pressures far in excess of those that we produced have been found within the rectal lumen and recordings of 50 cm water pressure are described…We would not think it safe to stress an anastomosis to such a pressure…this method is useful for demonstrating imperfections in anastomotic technique…”

   “This technique is simple, safe and effective and probably helps reduce leakage after colorectal anastomosis.”

   “We do feel that saline distension would visibly locate a potential leak more readily than air insufflation.”

   “… a successful test with an air-tight anastomosis can be taken by the surgeon as a reliable indicator that the anastomosis is very unlikely to leak in the postoperative period and that intraoperative repair of stapled anastomotic defects by interrupted sutures is a safe alternative to covering colostomy…”

   “A total of 145 consecutive patients receiving a colorectal anastomosis were randomized to ‘test’ or ‘no test’ once the anastomosis had been completed… Intraoperative air testing and repair of colorectal anastomoses significantly reduces the risk of postoperative clinical and radiological leaks.”

   “Intraoperative anastomotic testing, although not of proven value, seems logical as 6 per cent of our stapled anastomoses required suture reinforcement. A satisfactory intraoperative air test, however, will not guarantee uncomplicated healing of the low anastomosis. Leakage in
this group must be the result of factors other than the construction of structurally sound staple lines.”

“Mr. Gilbert is probably correct in suggesting that the results of intraoperative testing of colorectal anastomoses might be improved by measurement of the pressure. However, our aim was to use a method of testing which is simple, quick and acceptable to most surgeons. The addition of pressure monitoring is a council of perfection, which most surgeons would probably ignore.”

“Our study showed that per anum insufflation of air via a syringe was not a reliable method for predicting postoperative leakage from low rectal anastomoses, and we accept the criticism that failure to insufflate to a measured minimum pressure might have led to spurious results.”

“We describe a 10-year experience of anterior resection for rectal carcinoma in which all stapled anastomoses underwent intraoperative anastomotic testing by saline distension…This technique is simple, effective and probably helps reduce leakage following colorectal anastomoses.”

“The air test enabled the surgeon to repair or protect five anastomoses (24%). The completeness of the doughnuts was an unreliable test of anastomotic integrity.”

“A water-tight anastomosis was only achieved primarily in 79% of patients as shown by the first leak test, and in 95% of patients after additional sutures, as shown by the second leakage test…Intraoperative testing to a pressure of 30 cm H$_2$O is helpful in anterior resection, but does not guarantee that an intact anastomosis will remain intact postoperatively.”

“Values between 48 mmHg [65 cm water] and 184 mmHg [250 cm water] were measured for the initial strength of the various anastomoses.”

“The main problem of anastomotic testing is that you never know how effective one is performing the insufflation without measuring the pressure in the rectum. A more standardized procedure including a well-defined air pressure could be helpful in the future to avoid ineffective testing.”

In conclusion, our study of a large number of left-sided colorectal anastomoses indicates a substantial benefit for anastomotic leak testing.


“The Colorectal Anastomosis Leak Testers appear to be promising tools for the intraoperative detection of anastomotic leaks and seem to be at least as sensitive as the methylene blue/manometer method.”


“This prospective, randomized study was designed to establish if intraoperative air testing may reduce the dehiscence rate of stapled colorectal anastomoses...In our opinion, intraoperative air testing of colorectal anastomisis a good method for prevention of anastomotic dehiscence.”


“...we found that the risk of clinically significant leak and death was 77% lower when leak testing was used routinely.”


“Intraoperative anastomotic leak testing should be performed to help identify an anastomosis at increased risk of a subsequent clinical leak.”


“All valuable studies, those that use a no-test control group, show a lower percentage of CAL [colorectal anastomotic leakage] in the group in which ALT was performed; in two out of four papers this difference was significant.”


“Routine testing of colorectal anastomoses reduces the postoperative leak rate.”


“Postoperative anastomotic complications were significantly lower in patients tested with basic mechanical patency tests compared to those untested...”

24. Judge Nicholas Cooke, Q.C. Shortall-v-Mid-Essex-Hospital-Services-(NHS)-Trust_QBD. In the Royal Courts of Justice, Queen’s Bench Division, Neutral Citation Number: [2014] EwHC 246 (QB), Case No: TLQ 140125, December 15, 2014

“In summary, I find negligence and causation to have been proved in relation to the failure to carry out the bicycle tyre test”


“It seems sensible to recommend that all rectal anastomoses (and probably all left sided colonic anastomoses) for which a defunctioning proximal stoma is not being undertaken should routinely be tested for immediate “technical” defects by air insufflation (or a similar technique).”


“From a biomechanical point of view, a standardized volume of the injected air or water is difficult to establish because of the variation in patient’s anatomy. Thereby, pressure should be considered as a means for standardization....Being the quality control step of colorectal anastomosis, the air leak test is in dire need for worldwide standardization.”


“Intra-operative anastomotic testing was found to be widely employed in colon resection surgery with a mean testing rate of 86.5% for the study. Air insufflation was the most commonly used methodology to test for intra-operative anastomotic leaks...This study found an intra-operative leak rate of 6.4% within the sample of N=2,598 patients who received an intraoperative leak test during colorectal resection surgery, although dye tests and water bubble tests were also employed...the findings of this and other studies indicate that the use of intra-operative leak testing may be helpful in reducing the rate of post-operative leaks.”


A total of 31 surgeons then gave independent evaluations of the selected video to determine maximal distension for clinically adequate leak testing...The mean pressure for the stopping points [preferred testing pressure] chosen by the surgeons was 26.0 [35 cmH₂O] ± 1.8 mmHg with a range of 23.9 - 32.5 mmHg [32-44 cmH₂O]...We developed a preclinical anastomotic leak test that indicates that the pressure inside an adequately inflated colon is approximately 26 mmHg [35 cmH₂O].


“In conclusion, the results of this large comparative study favor the routine use of ALT [air leak test] during LLRC [laparoscopic left-sided colon resection] to verify the CA [colorectal anastomosis] integrity.”