WO-08 The abdomen: when to open, when to wait

HEALING after the FALL, research library, WO-08

Researched 10 October 2026 by Claude Opus agent for THRIVING after the FALL, Book Four. Library document, unverified.

Purpose and method

This report covers the acute abdomen without a surgeon. It builds on FO-02, on the natural history of appendicitis and typhoid (THRIVING library, FO-02), and FO-07, on the abdominal examination (THRIVING library, FO-07). The related reports NU-02, CH-11, MA-09 and OR-07 did not yet exist, so hernia, ectopic pregnancy and the nasogastric tube are covered here more fully.

About 46 searches and fetches were made. Two warnings run through everything below. First, the modern antibiotic trials gave intravenous drugs to patients whose appendicitis had been confirmed as uncomplicated by a CT scan. A village has neither. Second, the good results from non-physician surgeons come from trained, supervised and audited programmes. They do not show that an untrained person with a knife can do the same.

1. Findings by section

1.1 How the belly kills, and why the clock matters

Abdominal emergencies kill in three ways. Bleeding kills in hours (ruptured ectopic, a gunshot). Peritoneal infection kills in days (a burst appendix, perforated ulcer or typhoid hole). Strangled bowel dies first and then infects the peritoneum.

The WHO manual for district hospitals gives the clock for a perforated ulcer. Delay becomes critical about 6 hours after perforation. The chemical peritonitis caused by gastric juice turns bacterial in about 12 hours (WHO 2003). For appendicitis, Bickell and colleagues followed 219 patients in two New York hospitals. The risk of rupture was 2 per cent or less in the first 36 hours of symptoms. After that it rose by about 5 per cent for each further 12 hours. Rupture risk was 6.6 times higher after 36 hours, 4.2 times higher at age 65 or over, 3.6 times higher with fever above 38.9°C and 3.4 times higher with a pulse of 100 or more (Bickell 2006, abstract read).

The GlobalSurg cohort followed 10,745 patients after emergency abdominal surgery in 357 centres in 58 countries. Thirty-day mortality was 4.5 per cent in high-income countries, 6.0 per cent in middle-income and 8.6 per cent in low-income countries. After adjustment the odds of death were about three times higher in the low-income group (odds ratio 2.97). Seven deaths in ten came after the first day, in the ward (GlobalSurg Collaborative 2016, abstract read). Nursing, fluids and watching can affect these.

1.2 Appendicitis: what happened before surgery

Reginald Fitz of Boston described 257 cases in 1886 and named the disease. In 1890 he reported that 53 of 72 operated patients survived (Radhakrishnan and Koo 2022). Osler wrote in 1892 that many cases recovered without treatment, that over 40 per cent recurred, that 68 per cent of fatal cases died in the first eight days, and that spread to the whole

peritoneum was almost always fatal (THRIVING library, FO-02). John B. Murphy of Chicago performed his first appendectomy on 2 March 1889. Over about 2,000 cases his mortality fell from 11 per cent in the first 100 to 2 per cent in the last 100 (Radhakrishnan and Koo 2022).

The untreated mortality is not known with precision. A historical review cites Barnard for about 20 per cent mortality in severe unoperated cases (Radhakrishnan and Koo 2022) [VERIFY]. FO-02 cites Fowler (1904) for 17 per cent mortality when operated within 48 hours and 67 per cent on day 9 or 10. That figure is still unverified. Modern imaging studies suggest that perhaps 4 to 20 per cent of confirmed appendicitis resolves on its own (THRIVING library, FO-02). Frederick Treves, who drained King Edward VII's appendix abscess in 1902, had lost his own daughter to a perforated appendix in 1900 (Radhakrishnan and Koo 2022).

1.3 The Ochsner-Sherren regimen: waiting as a method

Albert Ochsner of Chicago published his treatment in JAMA in 1901 and in a handbook in 1902. Its rules were nothing by mouth, washing out the stomach, no purgatives, fluids given as saline by rectum, and the patient propped up in Fowler's position so that pus collected low in the pelvis rather than under the diaphragm (Radhakrishnan and Koo 2022). Ochsner reported 565 patients from 1 January 1898 to 1 May 1901. Of 18 with diffuse peritonitis, 10 died (55.5 per cent). Of 179 with gangrenous or perforated appendices, 9 died (5 per cent). Of 368 interval cases, 1 died. Overall mortality was 3.5 per cent. He found the method worked less well in the very young and the old (Radhakrishnan and Koo 2022). Ochsner operated on most of these patients. His regimen chose the moment to operate. It did not replace operating.

James Sherren refined it in 1905. Operate at once if the patient is seen within 24 to 36 hours. If seen later, when a mass has formed, wait and operate on the cold appendix weeks afterwards (Radhakrishnan and Koo 2022). Hamilton Bailey compared both arms between August 1927 and November 1929. Of 242 patients operated within 6 hours, 4 died. Of 73 treated by the Ochsner-Sherren regimen, 1 died (Radhakrishnan and Koo 2022). These were selected groups, not a trial.

The modern regimen for an appendix mass adds intravenous fluids and antibiotics and watches for a falling pulse, temperature and tenderness. Reviews report success in about 80 to 90 per cent, with failure in 2 to 4 per cent and occasionally up to 10 per cent. Interval appendectomy, if done at all, comes at 6 to 8 weeks (appendicular mass review, n.d.). The sources differ on fluids: rectal saline then, a drip now.

1.4 Antibiotics instead of the knife: the trials

Early trials. Eriksson and Granström randomised 40 patients in Sweden whose pain was under 72 hours old. The antibiotic group received intravenous cefotaxime 2 g every 12 hours with tinidazole 800 mg daily for 2 days, then oral ofloxacin 200 mg twice daily with tinidazole 500 mg twice daily for 8 days. One patient of 20 failed at 12 hours with a perforation. Seven (35 per cent) had a recurrence within a year. The antibiotic group used far less morphine, 0.9 mg against 17.8 mg (Eriksson and Granström 1995, full text read). Their paper also cites a Chinese report of 1977 in which 425 of 500 patients were treated with Chinese medicine plus antibiotics (Eriksson and Granström 1995).

APPAC. Salminen and colleagues randomised 530 adults aged 18 to 60 in Finland between November 2009 and June 2012. Every patient had a CT scan confirming uncomplicated appendicitis. The antibiotic arm received ertapenem 1 g daily intravenously for 3 days, then oral levofloxacin 500 mg once daily with metronidazole 500 mg three times daily for 7 days. At one year, 186 of 256 (72.7 per cent) had avoided an operation. Seventy (27.3 per cent) had been operated on. Surgery succeeded in 99.6 per cent. Non-inferiority was not shown (Salminen 2015, read via hosted copy and press summary). At five years, cumulative recurrence was 27 per cent at year 1, 34.0 per cent at year 2, 35.2 per cent at year 3, 37.1 per cent at year 4 and 39.1 per cent at year 5. Seven of the "recurrences" proved at operation not to be appendicitis. Delayed appendectomy did not cause more major complications (Salminen 2018, secondary summaries read).

APPAC II randomised 599 patients to oral moxifloxacin 400 mg daily for 7 days, or to ertapenem 1 g daily intravenously for 2 days followed by oral levofloxacin and metronidazole for 5 days. Success at one year was 70.2 per cent with oral treatment alone and 73.8 per cent with the intravenous start. Non-inferiority was again not shown (Sippola 2021, abstract read). At three years the figures were 63.4 and 65.2 per cent (Selänne 2024, abstract read). In a later analysis, an appendix 15 mm or more across on CT and a temperature above 38°C predicted failure. A C-reactive protein under 100 at 24 hours had a 99 per cent negative predictive value for complicated disease (Selänne 2025, abstract read). The temperature is the only one of these a village can measure.

APPAC III asked the sharper question. It randomised adults with CT-confirmed uncomplicated appendicitis to antibiotics or placebo. Only 72 were recruited, 35 on antibiotics and 31 on placebo analysed. At 10 days, 87 per cent on placebo and 97 per cent on antibiotics had recovered without surgery. The difference was not statistically significant, but the trial was small (Salminen 2022, abstract read). A 2026 meta-analysis of three trials (437 patients) comparing antibiotics with observation alone found no significant difference in initial success (risk ratio 1.03) or later appendectomy (risk ratio 0.98) (Lin 2026, abstract read). These were mild, scan-confirmed cases under hospital watch. They show that mild appendicitis often settles anyway.

CODA randomised 1,552 adults in 25 United States hospitals, 776 to each arm. Of these, 414 had an appendicolith, a hard faecal stone in the appendix. By 90 days, 29 per cent of the antibiotic arm had needed an appendectomy, 41 per cent of those with an appendicolith and 25 per cent of those without. Complications were 8.1 per 100 with antibiotics against 3.5 with surgery. With an appendicolith they were 20.2 against 3.6. Without one they were 3.7 against 3.5 (CODA Collaborative 2020, secondary summaries read). Long-term, about 40 per cent had been operated on by one year and 46 per cent by two years, though follow-up thinned sharply after year two (University of Washington n.d., secondary).

I agree with FO-02's CODA figures, but would add one point. The excess of complications is almost entirely in patients with an appendicolith, and only imaging can find one. After the Fall, every patient must be treated as though one might be present.

1.5 Appendicitis at sea and on the ice

Submarines. During the Second World War the United States Navy's prescribed treatment for appendicitis on a submarine was bed rest, ice packs on the abdomen and a liquid diet until the boat reached port. On USS Seadragon in September 1942, Pharmacist's Mate First Class Wheeler B. Lipes removed the appendix of Darrell Dean Rector, and two more submarine appendectomies followed in December 1942 (search summaries only, NHHC and USNI pages not opened [VERIFY]). The published review of conservative treatment at sea is Wojciechowicz and colleagues. They pooled 5 studies with 342 patients. Success was 90.8 per cent (range 88 to 95), and relapse at 12 months 15.9 per cent (range 5 to 37). For complicated cases, success was 89 per cent. They recommended a third-generation cephalosporin plus an imidazole, intravenous for 2 days and oral for 10 (Wojciechowicz 2010, abstract and summary read).

In 2001 Groetsch and Shaughnessy described a 22-year-old sailor on a United States submarine. He received intravenous metronidazole and gentamicin under an established protocol, was evacuated, and had a suppurative appendix removed on day 3. They cite Adams (1990): 9 submariners treated with antibiotics at sea, all of whom responded. They also cite Coldrey (1959): 471 patients, recurrence needing appendectomy under 20 per cent, interval appendectomy 16 per cent, one death in an elderly patient (Groetsch and Shaughnessy 2001, full text read).

Soviet ships. Gurin, Slobodchuk and Gavrilov reported 247 sailors treated conservatively on Soviet ships. Treatment worked best when started within the first 6 hours, with antibiotics, spasmolytics, antihistamines and sulfanilamides. Inflammation tended to localise (Gurin 1992, abstract read). The abstract gives no outcome counts, so the success rate cannot be stated.

Rogozov, 1961. Leonid Rogozov was the only doctor among about 13 men at the Soviet Novolazarevskaya station

in Antarctica. His symptoms began on 29 April 1961. Conservative treatment failed, and by 30 April he had signs of localised peritonitis. Flying him out was impossible. He operated on himself in the early hours of 1 May under local anaesthesia with 0.5 per cent novocaine, through an incision of 10 to 12 cm. He cut the caecum by accident and sutured it. He found a dark stain at the base of the appendix, suggesting it would have burst within a day. He put antibiotics into the peritoneum. His temperature was normal by day 5. The stitches came out on day 7, and he was back at work in about two weeks (Wikipedia 2026, LITFL n.d.). Sources disagree on the timing (22:00 Moscow time or 02:00 local) and on the duration (1 hour 45 minutes or 2 hours). One secondary account says the early treatment was antibiotics, starvation and cold compresses [VERIFY]. The BMJ account could not be opened (Rogozov and Bermel 2009, not read).

Rogozov was a trained surgeon with sterile instruments, local anaesthetic and antibiotics. His case shows the limit of waiting. It is not a model to copy.

1.6 The appendix mass and abscess

Andersson and Petzold pooled studies of appendiceal abscess and phlegmon (an inflamed mass). These make up 3.8 per cent of appendicitis. Non-surgical treatment failed in 7.2 per cent, and 19.7 per cent needed an abscess drained. Immediate surgery carried 3.3 times the odds of complications. After non-surgical treatment, 1.2 per cent were later found to have a cancer and 0.7 per cent another important disease. Recurrence was 7.4 per cent (Andersson and Petzold 2007, abstract read). The WHO manual agrees: treat the mass with rest, antibiotics, pain relief and fluids, and if pain or fever continue, incise and drain the abscess (WHO 2003). This is the most hopeful finding in the report. A patient who survives to form a mass has usually walled off the infection, and conservative care is the better choice, not merely the only one.

1.7 Perforated peptic ulcer

Before surgery a perforated ulcer was seldom survived. The first suture repair is credited to Mikulicz in 1884 or 1885, and the first success to Heusner in 1892. In 1903 Brunner reported 48 per cent mortality in 387 operated cases (Hospital Medicine 2005, secondary). In 1946 Taylor reported treating 28 patients by continuous nasogastric suction alone, with about 10 per cent mortality. Some sources give 11 per cent (Taylor and Warren 1956, title read, and secondary summaries [VERIFY]).

Crofts and colleagues then randomised 83 patients over 13 months. Forty received intravenous fluids, nasogastric suction, antibiotics and ranitidine. Forty-three had surgery. Eleven of 40 (28 per cent) did not improve within 12 hours and were operated on. Three of those had cancer (two gastric, one of the sigmoid colon). Mortality was 5 per cent in each arm. Hospital stay was 35 per cent longer with conservative care. Patients over 70 responded worse (Crofts 1989, secondary summaries read). More than 70 per cent of the conservative arm never needed an operation.

The counterweight is Cohen's 1971 Canadian survey of 852 cases. All 87 patients treated without operation died, against 9 per cent of those operated on (Cohen 1971, secondary summary read). These were patients judged too sick to operate on, so the comparison is unfair. But it is a warning. The Taylor and Crofts results came from hospitals with suction, drips, antibiotics and a surgeon who could step in at 12 hours.

1.8 Bowel obstruction and volvulus

Adhesive small bowel obstruction follows earlier surgery. The WHO manual treats simple mechanical obstruction without operation first: intravenous normal saline or Ringer's lactate, a nasogastric tube on free drainage with aspiration, narcotic pain relief, urine output measured, and examination at least twice a day. If it has not resolved by 48 hours, or if the patient worsens, the manual calls for laparotomy (WHO 2003). Signs of gangrene are continuous pain, fast pulse, fever, low blood pressure late on, tenderness, guarding and absent bowel sounds (WHO 2003). The

Bologna guidelines of 2013 allow up to 72 hours of tube decompression if there are no signs of strangulation. Water-soluble contrast reaching the colon within 24 hours predicts resolution (Di Saverio 2013). A 2017 update exists but was not read (ten Broek 2018). The WHO manual and Bologna differ on the limit, 48 hours against 72. Reported non-operative success is 70 to 90 per cent (search summaries [VERIFY]). A first obstruction in a belly never operated on is more often a hernia, tumour or volvulus [VERIFY].

Sigmoid volvulus is a twist of the lower colon, common in parts of Africa, Asia and South America. The WHO manual describes untwisting it without anaesthetic. The patient kneels with elbows down, or lies on the left side, and a sigmoidoscope guides a soft rectal tube past the twist. A rush of gas and liquid stool marks success (WHO 2003). Atamanalp's Turkish series is the largest. Non-operative treatment in 750 patients succeeded in 82.7 per cent with 0.7 per cent mortality. Emergency surgery in 476 carried 16.8 per cent mortality. In gangrenous volvulus, mortality was 26.3 per cent after a stoma and 17.5 per cent after anastomosis (Atamanalp 2020). A 2026 meta-analysis of endoscopic untwisting found 80 per cent success, 33.9 per cent recurrence and a pooled mortality of 22.6 per cent, the last probably reflecting sicker hospital populations (Sabatini 2026, abstract read). The sources agree on about 80 per cent success but not on mortality. A third or more will twist again.

In children, the WHO manual lists intussusception (reducible by enema if early) and roundworm (Ascaris) obstruction, which is treated with anthelmintics (WHO 2003).

1.9 Strangulated and incarcerated hernia

An incarcerated hernia is stuck. A strangulated one has lost its blood supply. For strangulation the WHO manual prescribes intravenous fluids, a nasogastric tube and emergency surgery (WHO 2003). In Lilongwe, Malawi, Williams and colleagues studied 297 patients with irreducible inguinal hernias between 2013 and 2019. Strangulation was present in 19.5 per cent. Overall mortality was 5.4 per cent. A delay of 24 hours or more from arrival to operation carried a relative risk of death of 11.24, and 55 per cent of patients waited that long (Williams 2021, abstract read).

Taxis is the gentle manual reduction of a stuck hernia. In a prospective study of 86 adults, it succeeded in 66 per cent with no complications. Other series report 25.4 per cent (548 patients, Israel) and 18 of 130 (China) (prospective taxis study 2022, PMC8807094, and its cited series). The usual rule is gentle, steady pressure for 5 to 15 minutes, only within about 24 hours of the lump becoming painful and irreducible, and only without signs of strangulation (prospective taxis study 2022, and review cited there). The fear is reduction en masse, where the bowel goes back inside still trapped in its sac. A figure of about 0.3 per cent dates from 1908 [VERIFY]. Pain that continues after the lump has gone is the warning sign.

In children taxis works better. Series report 80 per cent (56 children, Nigeria), 83 per cent (36, Nepal), 85 per cent (1,582 children) and 84 per cent (71 of 85) (paediatric hernia series, search summaries [VERIFY]). The WHO manual allows reduction of an early incarcerated hernia in a child, followed by referral for repair (WHO 2003). One series found that 35 per cent of infants under 12 months became incarcerated while waiting for surgery (search summary [VERIFY]).

1.10 Ruptured ectopic pregnancy

A pregnancy implanted in the tube can burst at about 6 to 10 weeks and bleed into the belly [VERIFY]. Before surgery it was usually fatal. Secondary sources give "greater than 60 per cent" or "almost always fatal" [VERIFY]. John Parry of Philadelphia proposed operating in 1876 and was ridiculed. Lawson Tait of Birmingham operated in 1883. By 1888 he reported 42 cases with 40 cures (OG Magazine n.d.). Tait worked before blood transfusion. Tying off the bleeding tube was enough for most women, if done in time.

At district level the problem is blood. U. Poeschl describes a Malawian district hospital where 25 women with ruptured ectopic pregnancy had their own blood collected from the abdomen at operation and returned to them. All survived without adverse effects. The blood was filtered through at least three layers of gauze into a bottle containing

anticoagulant. It was not used if infected or contaminated by bowel contents, and was given at once, never stored (Poeschl n.d., full text read). A review of 22 studies with 797 ruptured ectopics reported 1 death (pulmonary embolism) and 9 complications (search summary [VERIFY]). Bautz's thesis from Johannesburg (77 patients, 12 ectopics) reached the same conclusion (Bautz 1993, secondary). A Pakistani note advises against returning blood that has lain in the abdomen for more than 24 hours [VERIFY]. This is an infirmary procedure, needing a laparotomy, sterile equipment and a pharmacy-grade anticoagulant, whose recipe is deliberately not reproduced.

1.11 Typhoid perforation

Typhoid ulcerates the end of the small bowel. Perforation and bleeding come in the second or third week (THRIVING library, FO-02). Harvey Cushing cited a mortality of 95 per cent for typhoid perforation in his day (Hospital Medicine 2005, secondary [VERIFY]). Mogasale and colleagues reviewed 42 reports of 4,626 patients in low- and middle-income countries. There were 706 deaths, a pooled case fatality of 15.4 per cent, down from 39.6 per cent for 1960 to 1990. Mean hospital stay was 18.4 days (Mogasale 2014, abstract read). In children in sub-Saharan Africa, reported mortality ranges from 4.6 to 75 per cent, mostly 11 to 30 per cent (Birkhold 2020, summary read). In Blantyre, Malawi, 2 of 11 died (Olgemoeller 2020, summary read). A 1975 surgical series of 161 patients had 9.9 per cent mortality and found that delay worsened survival (search summary [VERIFY]). Nobody has shown that typhoid perforation can be nursed through without an operation. The rare conservative survivors were selected cases.

The district response is prevention and early treatment of typhoid, which FO-02 covers. A district that treats typhoid in its first week will see fewer perforations. In Cruz Espinoza's review, complications ran at 36 per cent in late arrivals against 16 per cent in early ones (THRIVING library, FO-02).

1.12 Penetrating wounds of the abdomen

During the Boer War (1899 to 1900), Sir William MacCormac argued that a soldier shot in the abdomen was safer left alone than operated on. Of 207 abdominal wounds in the official history, 26 had laparotomies and 18 of those died (forum transcription of the official history, secondary [VERIFY]). In the Spanish-American War almost every operated case died (Scotland 2023). In the Great War, expectant treatment gave way to operation at casualty clearing stations. Cuthbert Wallace and John Fraser reported 2,127 penetrating abdominal wounds between 1 July 1915 and 30 September 1917. Mortality fell from 80 to 60 per cent. Of 1,707 cases considered for operation, 102 did not need it. The 1,605 operations carried 53 per cent mortality. Another 420 men judged moribund were kept comfortable and allowed to die. Operation within 6 hours favoured the patient. Few survived with a pulse over 120. Early deaths were from bleeding, late ones from sepsis (Scotland 2023, full text read).

Modern humanitarian surgery does better. EMERGENCY's surgical centre at Lashkargah in Afghanistan treated 953 patients with penetrating abdominal injury between 2006 and 2016. Mortality was 12.8 per cent, and time to treatment over 5 hours was a risk factor (Cardi 2019). In an ICRC field hospital in Afghanistan between 1990 and 1992, 73 patients with colon wounds had 4 deaths (5.5 per cent). Deaths were linked to delay and age (ICRC colon series, abstract read [VERIFY authors]). The ICRC textbook, War Surgery volume 2 (Giannou, Baldan and Molde 2013), could not be fetched. Among 37 Syrian casualties who arrived more than 12 hours after wounding, 86 per cent were managed without operation (search summary [VERIFY]). That is a survivor group.

MacCormac was right that a bad operation late is worse than none. Wallace was right that a good operation early saves about one in five who would otherwise die. A village without a surgeon is in MacCormac's position. Its job is to keep the wounded warm, still, nil by mouth and comfortable, and to move anyone with a pulse under 120 towards an operating table within 6 hours.

1.13 The signs and the decision rules

FO-07 gives the examination. For appendicitis, rigidity has a positive likelihood ratio of 2.96, guarding 2.48 and percussion tenderness 2.86. Bowel sounds are poor, with a sensitivity of 0.42 for obstruction (THRIVING library, FO-07). I agree with FO-07 that the dangerous belly is the rigid one, in a patient lying still. The rules below are built from the sources above and untested as rules.

1. Hours since the pain began. Under 36 hours, appendicitis has usually not burst (Bickell 2006). A hernia stuck for under 24 hours may still be reducible (prospective taxis study 2022).
2. Pulse and temperature. A pulse of 100 or more or a temperature above 38.9°C raises the chance of rupture (Bickell 2006). A pulse over 120 after a wound meant few survived (Scotland 2023).
3. The trend over 12 hours. Crofts operated on ulcer patients who had not improved by 12 hours (Crofts 1989).
4. For obstruction, the trend over 48 to 72 hours (WHO 2003, Di Saverio 2013).
5. A lump in the right lower belly after several days means a walled-off appendix. Treat without operation (Andersson and Petzold 2007).
6. Peritonitis means gangrene or perforation and needs surgery (WHO 2003). Without surgery, give the full conservative regimen and comfort.

1.14 Nil by mouth, the tube and fluids

Nil by mouth and the tube. Every regimen above starts with resting the gut. Ochsner washed out the stomach. Taylor used continuous suction. The WHO manual uses a nasogastric tube for obstruction, perforation and strangulation (WHO 2003). The Cochrane review found that routine tubes after surgery did not speed recovery, in 37 studies with 5,711 patients, and preferred selective use (Verma and Nelson 2007, abstract read). That concerns routine use after operation. For obstruction and perforation the tube remains standard.

Fluids without a drip. A patient who cannot drink still needs about 1.5 to 2.5 litres a day [VERIFY]. Ochsner gave saline by rectum (Radhakrishnan and Koo 2022). Bruera and colleagues gave rectal fluids to 78 terminally ill cancer patients. A size 22 French tube was passed about 40 cm into the rectum. Tap water (76 patients) or saline (2 patients) ran in at a mean of 250 ml an hour (standard deviation 63) for a mean of 15 days. Mean discomfort was 19 out of 100. Four patients stopped because of discomfort. The cost was 8 Canadian cents a day (Bruera 1998, abstract and summary read). Whether rectal fluid is absorbed well in an obstructed or inflamed bowel has not been studied [VERIFY].

Fluid under the skin (hypodermoclysis) needs sterile fluid and a needle. The American Family Physician review allows about 3 litres in 24 hours at two sites (Sasson and Shvartzman 2001). The West Midlands palliative care guidance is stricter: up to 100 ml an hour, usually 2 litres in 24 hours, with no more than 1.5 litres at one site (West Midlands Palliative Care n.d.). The two sources differ on the daily total. In a 2012 trial, 1 litre a day did not improve symptoms in dying cancer patients (Cancer Network n.d. [VERIFY]).

Antibiotics are dangerous substances in this book's sense, and the most useful thing a village could hold for the abdomen. Doses from two sources:

Regimen	Source A	Source B	Where they differ
Peritonitis, intravenous	Ampicillin 2 g every 6 h, gentamicin 5 mg/kg once daily, metronidazole 500 mg every 8 h (WHO 2003)	Ceftriaxone 2 g once daily plus metronidazole 500 mg every 12 h (UCSF 2025)	Different drugs, metronidazole 8- or 12-hourly

Regimen	Source A	Source B	Where they differ
Appendicitis, intravenous then oral	Ertapenem 1 g daily for 3 days, then levofloxacin 500 mg daily plus metronidazole 500 mg three times daily for 7 days (Salminen 2015)	Cefotaxime 2 g 12-hourly plus tinidazole 800 mg daily for 2 days, then ofloxacin 200 mg twice daily plus tinidazole 500 mg twice daily for 8 days (Eriksson and Granström 1995)	Total 8 to 10 days in both. Wojciechowicz recommends 2 days intravenous, 10 oral (Wojciechowicz 2010)
Appendicitis, oral only	Moxifloxacin 400 mg daily for 7 days (Sippola 2021)	Ciprofloxacin 500 mg every 12 h plus metronidazole 500 mg every 12 h by mouth, 7 days if uncomplicated, 4 days after source control (UCSF 2025)	Single drug against two

The harms are allergy, which can kill within minutes, especially with penicillins and cephalosporins. Gentamicin damages kidneys and hearing, worse in the dehydrated and the old. Metronidazole causes nausea and a violent reaction with alcohol. These harm details were not researched here [VERIFY]. Salvaged antibiotics after the Fall will be expired, incomplete and mixed. A partial course of the wrong drug may mask the signs without curing the infection [VERIFY].

1.15 Laparotomy by non-physicians

Mozambique. From 1984 Mozambique trained técnicos de cirurgia, assistant medical officers taught surgery over 3 years (2 at Maputo Central Hospital and a 1-year internship). Vaz and colleagues reported that 14 técnicos performed 10,258 operations, 70 per cent of them emergencies. Postoperative mortality was 0.4 per cent for emergencies and 0.1 per cent for elective operations (Vaz 1999, abstract read). Pereira's comparison of caesarean sections found no clinically significant difference between 978 done by técnicos and 1,113 by obstetricians. Técnicos also performed bowel resections, colostomies and splenectomies, and did about 90 per cent of district obstetric surgery. At 7 years, 88 per cent remained in district posts, against almost none of the doctors (Pereira 2012, slides read). The 1996 and 2007 papers by Pereira were not read in full.

Sierra Leone. CapaCare trained community health officers in surgery. Bolkan and colleagues reviewed 27,216 supervised operations in 16 hospitals between January 2011 and July 2016. Caesarean mortality was 0.7 per cent for trainees (13 of 1,915) and 0.4 per cent for qualified officers (5 of 1,169). Laparotomy mortality was 4.3 per cent for trainees (7 of 164) and 8.0 per cent for qualified officers (11 of 137). After adjustment, the odds of death were lower than for the supervising doctors (odds ratio 0.47 for trainees and 0.16 for qualified officers) (Bolkan 2017, abstract read). This probably reflects case selection, with the hardest cases going to the doctors [VERIFY].

Malawi, Zambia and the wider record. A review of non-surgeons in low- and middle-income countries found 65 articles and 14 abstracts. At three separate hospitals non-physicians did about 90 per cent of obstetric surgery, 38.5 per cent of general surgery and 43 per cent of non-obstetric laparotomies (Hoyler 2015, abstract read). In 17 district hospitals in Malawi and Zambia, perioperative mortality was 0.43 per cent in Zambia and 0.19 per cent in Malawi (RCSI 2022, summary read). At Kamuzu Central Hospital in Lilongwe, a tertiary centre, 189 emergency laparotomies had 14.8 per cent mortality. Nine per cent developed an intra-abdominal complication, and 47 per cent of those died (Sincavage 2021, abstract read).

Mission surgeons. I found no usable mortality series. King's Primary Surgery could not be read.

These programmes had years of training, a supervising surgeon, anaesthesia, sterile instruments, blood and audit. A district after the Fall might have one person with some of this. Murphy's first 100 appendectomies had 11 per cent mortality. A first-generation district surgeon should expect something nearer Murphy's figure than CapaCare's [VERIFY].

2. Evidence grades

Grades follow the frame (A to D, and X).

Practice	Grade	Tradition says	Record shows	Science infers
Antibiotics for scan-confirmed uncomplicated appendicitis	A	Not traditional	About 70 per cent avoid surgery at 1 year, 60 per cent at 5 years (APPAC, CODA)	Safe in selected patients. Unknown without imaging
Antibiotics for unconfirmed appendicitis at sea	B	Naval protocol	90.8 per cent success in 342 (Wojciechowicz 2010)	Selection bias likely
Observation alone in mild appendicitis	B (weak A)	Osler: many get well	87 per cent at 10 days on placebo (APPAC III, small)	Mild cases often settle
Ochsner-Sherren for late or mass cases	B	Starve, rest, propped up	1 death in 73 (Bailey). Failure 7.2 per cent (Andersson)	Better than early surgery once a mass forms
Nasogastric suction for perforated ulcer	A (one trial)	Taylor 1946	5 per cent mortality, 28 per cent operated at 12 h (Crofts)	Works only with a surgeon in reserve
Tube decompression for adhesive obstruction	B	WHO standard	70 to 90 per cent resolve	Only without strangulation
Rectal tube for sigmoid volvulus	B	WHO standard	About 80 per cent success, one third recur	Buys time only
Taxis of a hernia under 24 hours old, no strangulation	B	Standard first step	66 per cent adults, 80 to 85 per cent children	Risk of reducing dead bowel is small but real
Autotransfusion in ruptured ectopic at laparotomy	B	None	25 of 25 survived (Malawi)	Safe if not contaminated
Non-physician laparotomy in a supervised programme	B	None	4 to 8 per cent mortality (Sierra Leone)	Depends on training and supervision

Practice	Grade	Tradition says	Record shows	Science infers
Expectant care for penetrating wounds	B	MacCormac	About 80 per cent died early in the Great War	Only for the moribund or those far from surgery
Routine nasogastric tube after surgery	X	Common habit	No benefit in 5,711 patients	Use selectively
Purgatives or enemas for abdominal pain	X	Widespread folk practice	Ochsner forbade them [VERIFY for outcome data]	Can burst an inflamed appendix [VERIFY]
Rectal fluids (proctoclysis)	B for tolerance, D for abdominal emergencies	Ochsner's saline	Well tolerated in 78 dying patients	Untested in peritonitis
Bowel sounds as decider	X as decider	Classic teaching	Sensitivity 0.42 (FO-07)	Do not rely on them

No plant remedy for the acute abdomen was found with evidence above D. The Chinese series cannot separate herbs from antibiotics (Eriksson and Granström 1995). No plants are recommended, so no binomials are given.

3. Means ledger

Rung	What it can do	What it changes
Hands and knowledge alone	Recognise the belly that needs a surgeon. Time the pain. Count pulse and breathing. Nil by mouth. Position propped up. Gentle taxis of a fresh hernia in a child. Comfort and presence	Early recognition and early departure for help. Stops harmful purging and feeding
Hearth	Boiled water and sips once allowed. Warmth. Cold cloths for comfort. Bedpan. Oral rehydration solution once vomiting stops. Rectal fluid with boiled, cooled water by a soft tube	Keeps the patient hydrated and still. Supports the body's walling-off
Garden and still	Scale and pressure cooker to make clean rectal fluid and sterilise tubes and cloth. Alcohol for skin. Recording chart	Cleaner fluids, safer tubes, better records
Village dispensary (300)	A trained lay healer. Thermometer. Watch. Nasogastric tube if salvaged. Oral or intravenous antibiotics if held. Oral opioid if held. Subcutaneous fluid if sterile fluid exists. Twice-daily charting	This is where conservative appendicitis care and obstruction care become possible. Expect perhaps 7 in 10 with mild appendicitis to settle (APPAC, without the scan) [VERIFY for village conditions]

Rung	What it can do	What it changes
District infirmary (3,000)	A nurse, doctor or trained non-physician. Sterile room. Local or ketamine anaesthesia if any. Drainage of an appendix abscess. Rectal tube detorsion of volvulus. Hernia repair. Laparotomy for ectopic with autotransfusion. Intravenous fluids and antibiotics. Lab bench for haemoglobin and microscopy	Turns near-fatal conditions (strangulated bowel, ruptured ectopic) into survivable ones. Expect laparotomy mortality of 4 to 15 per cent at best
Hospital reference	CT or ultrasound. Laparoscopy. Anaesthesia. Blood bank. Intensive care	Appendicitis mortality under 0.3 per cent (THRIVING library, FO-02). Emergency abdominal surgery 30-day mortality 4.5 to 8.6 per cent (GlobalSurg 2016)

Below the infirmary, everything is supportive care that improves the odds of self-healing. At the infirmary, a few emergencies become curable.

4. Harm test

Purging and feeding. The folk response to belly pain is a laxative, an enema or food. Ochsner banned all three, on the theory that stirring the gut spreads infection (Radhakrishnan and Koo 2022). I found no trial data on this [VERIFY].

Delay. The deadliest error is waiting too long to send someone on (Williams 2021, Bickell 2006, Scotland 2023, Cardi 2019). Waiting is a treatment only for conditions that resolve by themselves. It is never a reason to delay a journey.

Taxis done wrong. Forcing a hernia back can push dead bowel into the belly, or the whole sac with the trap still on it. Signs: pain continues after the lump has gone, fever, vomiting, a rigid belly. Then treat as strangulation. Never use force. Never attempt it after 24 hours or with red, hot, tender skin over the lump [VERIFY for the skin signs].

Nasogastric tube. Passed into the windpipe it causes coughing and choking, and fluid poured down it can drown the patient. Fluid lost from the tube must be replaced [VERIFY].

Rectal tube. In volvulus, forcing the tube can tear the bowel. Blood-stained return or a dark, dusky bowel lining means gangrene, and the bowel needs surgery (WHO 2003). In the dying patient, rectal fluid can cause discomfort and leakage (Bruera 1998).

Fluids under the skin. Infection, swelling and overload in the frail. Sterile fluid only (West Midlands Palliative Care n.d.).

Antibiotics. As in 1.14. Some, such as fluoroquinolones, are avoided in pregnancy [VERIFY]. They may hide the signs of a perforation while the patient deteriorates. Eriksson's single failure perforated at 12 hours on full intravenous antibiotics (Eriksson and Granström 1995).

Opioids. Slow the breathing, worst in the old, the dehydrated and children [VERIFY].

Amateur surgery. Rogozov cut his own caecum while operating on himself. Murphy's first 100 operations carried 11 per cent mortality (Radhakrishnan and Koo 2022). An untrained person who opens a belly will very likely kill faster than the disease. The book must forbid it.

Who is at special risk. The very young and the old do worse with the Ochsner regimen (Radhakrishnan and Koo 2022) and with conservative ulcer care (Crofts 1989). Any woman of child-bearing age with lower belly pain and a missed period may have an ectopic pregnancy and must not be "watched" like appendicitis. A child with a hernia must be repaired early, because one in three infants incarcerates while waiting [VERIFY].

5. Red flags

These signs mean the patient will probably die or be harmed without what the village cannot give:

1. A rigid, board-hard belly and a patient lying still (THRIVING library, FO-07).
2. A pulse over 120, or a pulse rising over 12 hours while the temperature rises.
3. Fever above 38.9°C with belly pain for over 36 hours.
4. Pain that changes from colic to constant, in obstruction (WHO 2003).
5. Vomiting that is green or faecal, with a swollen belly and no stool or wind.
6. A hernia that is hard, tender, red or stuck for more than 24 hours.
7. A woman of child-bearing age with belly pain and fainting, pallor, a fast pulse, or pain in the shoulder tip.
8. Typhoid in its second or third week with new sudden belly pain.
9. A wound that has gone through the belly wall, especially with bowel or omentum showing.
10. Blood or a dark return through a rectal tube in volvulus.

What to do anyway. Start the journey if any surgeon can be reached. Keep the patient warm, propped up and nil by mouth, with antibiotics if held and generous pain relief. FO-02's Protocol 4 gives comfort and fluids for a rigid belly with fever. I disagree in part. Generalised peritonitis is not always fatal. In Ochsner's series 8 of 18 survived diffuse peritonitis, though with surgery (Radhakrishnan and Koo 2022). Conservative care at sea succeeded in 89 per cent of so-called complicated cases, though these were selected (Wojciechowicz 2010). The village should give the full regimen alongside comfort, not instead of it.

Honest comfort. Some patients will not live. The record of the Western Front shows that doctors made this choice for 420 men and kept them comfortable (Scotland 2023). Comfort means opioids if any, a propped position, a damp cloth on the lips instead of drinks that will be vomited, warmth, turning, and someone present. A nasogastric tube can relieve repeated vomiting even when nothing can be cured. Speak plainly to the family.

6. The case against

Against waiting. Murphy argued that every appendix should come out early, and his falling mortality from 11 to 2 per cent proved that surgery could be made safe (Radhakrishnan and Koo 2022). CODA showed complications nearly six times higher with antibiotics in patients with an appendicolith (CODA Collaborative 2020). The APPAC investigators themselves did not show antibiotics to be non-inferior, and more than a third of patients had been operated on by five years (Salminen 2018). Cohen's 100 per cent mortality in unoperated perforated ulcers is a reminder that "conservative" patients are often those too sick to operate on (Cohen 1971).

Against cutting. MacCormac's critics were right in 1915, but MacCormac was right in 1900. The early laparotomy for gunshot wounds killed more than it saved when done late and badly (Scotland 2023). Andersson and Petzold showed immediate surgery for an appendix mass carried 3.3 times the complications (Andersson and Petzold 2007). APPAC III suggests that even antibiotics may be unnecessary for many mild cases (Salminen 2022). Sincavage's Lilongwe series shows what happens after laparotomy without intensive care: of those with complications, nearly half died (Sincavage 2021).

Against the non-physician model. All the task-sharing data come from programmes with training, supervision and audit. Bolkan's adjusted figures favour the officers over the doctors, which probably reflects case allocation rather than skill. Hoyler's review abstract reported no outcome comparisons (Hoyler 2015). The figures cannot be carried to a district after the Fall without a large discount.

Against the trials as a guide. The large antibiotic trials used imaging to exclude perforation, abscess and appendicolith, and most used intravenous drugs for the first days. APPAC's 70 per cent belongs to a pre-sorted group. In an unsorted village group, success will be lower [VERIFY].

Today against after the Fall. Today, the answer for every acute abdomen is to reach a hospital. After the Fall, the honest answer is that most appendicitis and most adhesive obstruction will settle with rest, starving and fluids, many with antibiotics, and some will not. Perforated ulcer, strangulated hernia, ruptured ectopic, typhoid perforation and penetrating wounds will mostly kill without an operation. A district infirmary with one trained person could save many of them.

7. 10-line summary

1. With CT selection and antibiotics, about 70 per cent of uncomplicated appendicitis avoids surgery at 1 year and about 60 per cent at 5 years (APPAC).
2. Mild appendicitis often settles even on placebo (87 per cent at 10 days, APPAC III, small).
3. Rupture risk is low under 36 hours and rises about 5 per cent per 12 hours after (Bickell).
4. An appendix mass is better treated without surgery: failure 7.2 per cent (Andersson and Petzold).
5. Perforated ulcer with suction and antibiotics: 5 per cent mortality, but 28 per cent still needed surgery at 12 hours (Crofts).
6. Adhesive obstruction resolves in 70 to 90 per cent with tube and drip. The limit is 48 to 72 hours.
7. Sigmoid volvulus untwisted by rectal tube: about 80 per cent success, a third recur.
8. A stuck hernia waiting 24 hours or more had an elevenfold death risk (Lilongwe). Taxis works in two thirds of adults and most children if early.
9. Ruptured ectopic, typhoid perforation and penetrating wounds need an operation. Delay kills.
10. Supervised non-physician surgeons have achieved laparotomy mortality of 4 to 8 per cent (Sierra Leone) and very low overall surgical mortality (Mozambique).

8. Open questions

1. What is the success rate of conservative appendicitis treatment without imaging and without intravenous antibiotics? The Soviet series of 247 sailors might answer this, but its outcome counts were not found.
2. What did Ochsner's regimen achieve in patients never operated on? His published numbers include surgery.
3. How well is rectal fluid absorbed in peritonitis or obstruction?
4. What mortality did mission surgeons and first-generation trainees achieve without supervision? Not found.
5. Does a partial course of salvaged antibiotics help or harm in suspected appendicitis?
6. What is the true untreated mortality of appendicitis? Estimates around 20 per cent remain unverified.
7. Can a district infirmary achieve safe anaesthesia for laparotomy?
8. The true risk of reduction en masse in taxis by lay healers.

9. Sources to read in full

1. WHO 2003, Surgical Care at the District Hospital. The working manual for the district rung.
2. Giannou, Baldan and Molde 2013, War Surgery volume 2 (ICRC). Not read here, essential for penetrating wounds.
3. King, Primary Surgery volume 1. Not read here, written for non-specialists.

4. Salminen 2015 and 2018, APPAC and its five-year follow-up.
5. CODA Collaborative 2020, with its appendicolith subgroup.
6. Andersson and Petzold 2007, on the appendix mass.
7. Crofts 1989, the only randomised trial of conservative treatment for perforated ulcer.
8. Scotland 2023, the history of abdominal wounds in the Great War.
9. Bolkan 2017 and Vaz 1999, on non-physician surgery.
10. Rogozov and Bermel 2009, the primary account of the Antarctic case.

At the bedside after the Fall

Household. It learns to recognise the dangerous belly, time the pain, count pulse and breaths, keep the patient nil by mouth and propped up, and never purge. It needs a watch or sand-glass, a notebook, boiled water and a soft tube for rectal fluid. It can reduce a child's fresh hernia gently. Its first failure will be giving food or a laxative to a child with appendicitis, or waiting a day too long with a stuck hernia.

Village of 300. The dispensary needs one trained lay healer, a thermometer, nasogastric tubes, salvaged antibiotics sorted and dated, any opioid, sterile fluid if possible, and a twice-daily chart for every abdominal patient. It can run the Ochsner regimen with antibiotics for appendicitis, decompression for obstruction, and comfort care. It must have an agreed route and transport to the district. Its first failure will be a woman with an ectopic pregnancy treated as appendicitis, or a patient kept too long because the journey is hard.

District of 3,000. The infirmary needs at least one person trained by apprenticeship to open and close an abdomen, anaesthesia (local or ketamine), sterile instruments, a lit room, suture, and a way to give blood or autotransfuse. Its first targets are those with the clearest payoff: strangulated hernia, ruptured ectopic, appendix abscess drainage and volvulus. It should audit every operation and death, as Wallace and CapaCare did. Its first failure will be an over-ambitious laparotomy for diffuse peritonitis that ends in death, and the temptation to stop operating afterwards.

Protocols

These protocols do not teach surgery. Where two sources differ, the more cautious figure is given.

Protocol 1. The belly chart (every abdominal patient) - [ ] Write the hour the pain began. Write the hour now. - [ ] Every 4 hours (twice daily at minimum, WHO 2003): pulse, breaths, temperature, where the pain is, whether the belly is soft or hard, vomiting, stool and wind, urine passed. - [ ] Mark each line better, same or worse. - [ ] Worse on two charts in a row: treat as a red flag.

Protocol 2. The resting regimen (Ochsner-Sherren, modern form) - [ ] Nothing by mouth except sips for comfort or tablets. No food. No laxative. No enema. - [ ] Prop the patient up at about 45 degrees [VERIFY angle]. - [ ] Fluids by drip if available. Otherwise by rectal tube (Protocol 4). - [ ] Antibiotics if held, per the table in 1.14. Course 8 to 10 days in all. - [ ] Pain relief. - [ ] Re-examine at 12 hours. Better: continue. Worse: red flag. - [ ] Once pain eases and the patient passes wind: clear fluids, then soft food over 2 to 3 days [VERIFY]. - [ ] After recovery, expect about one in three to have a further attack within years (APPAC 5-year).

Protocol 3. Suspected appendicitis - [ ] Pain moving from the navel to the right lower belly, with loss of appetite, nausea or fever (THRIVING library, FO-02). - [ ] Any woman who could be pregnant: think of ectopic pregnancy first (Protocol 7). - [ ] Under 36 hours with a surgeon reachable: go now. - [ ] No surgeon: Protocol 2. - [ ] A tender lump in the right lower belly after several days [VERIFY timing]: an appendix mass. Protocol 2. Do not cut. - [ ] Pain or fever continuing with the lump: abscess. Infirmary drainage (WHO 2003).

Protocol 4. Rectal fluid (proctoclysis) - [ ] Use boiled water cooled to body warmth. Bruera used tap water. - [ ] A soft tube of about 7 mm (22 French), greased, passed gently about 40 cm. Never force [VERIFY lubricant]. - [

] Run by gravity at about 250 ml an hour (Bruera 1998). - [ ] Stop for pain, cramp, leakage or a swelling belly. - [ ] Ochsner used saline (Radhakrishnan and Koo 2022), Bruera tap water. Untested in peritonitis.

Protocol 5. Taxis of a stuck hernia - [ ] Only if the lump has been stuck for under 24 hours, and only if the skin is not red, the lump is not exquisitely tender, and the patient is not vomiting or feverish. - [ ] Lie the patient down, hips bent, with pain relief first [VERIFY]. - [ ] Apply gentle, steady pressure on the lump towards the opening for 5 to 15 minutes. Never force. - [ ] Success: the lump goes back, often with a gurgle, and the pain eases. - [ ] After success: watch for 24 hours. Continuing pain, fever, vomiting or a hard belly means strangled bowel went back. Go to the infirmary. - [ ] Failure: nil by mouth and send to the infirmary at once. Delay over 24 hours carried an elevenfold death risk (Williams 2021). - [ ] Children: success is higher (80 to 85 per cent). Arrange repair soon.

Protocol 6. Bowel obstruction - [ ] Vomiting, swollen belly, colicky pain, no stool or wind. - [ ] Look for a hernia in both groins and at the navel. If present: Protocol 5. - [ ] Nil by mouth. Nasogastric tube on free drainage if available. Measure what comes out and replace it with fluid. - [ ] Fluids by drip. Without a drip, rectal fluid is unlikely to be enough [VERIFY]. - [ ] Pain relief. - [ ] Chart twice daily (WHO 2003). - [ ] Improving at 48 hours: continue up to 72 hours (WHO 2003, Di Saverio 2013). - [ ] Constant pain, fever, fast pulse, a rigid tender belly, or no improvement at 48 to 72 hours: needs an operation. - [ ] Older patient with a hugely swollen belly and sigmoid volvulus suspected: infirmary for rectal tube detorsion (WHO 2003).

Protocol 7. A woman with belly pain who could be pregnant - [ ] Any missed or late period, any pregnancy, any vaginal bleeding. - [ ] Fainting, pallor, fast pulse, pain in the tip of the shoulder: ruptured ectopic until shown otherwise. - [ ] Lie her flat, legs raised, keep warm, nil by mouth. - [ ] Go to the infirmary at once. Bleeding kills in hours. There is no waiting regimen.

Protocol 8. Penetrating wound of the belly - [ ] Cover any protruding gut with a clean, damp cloth. Do not push it back [VERIFY]. - [ ] Nil by mouth. Keep warm. - [ ] Count the pulse. Note the time of wounding. - [ ] Pulse under 120 and an infirmary within reach: go now. The 6-hour window (Scotland 2023) and 5-hour window (Cardi 2019) are the targets. - [ ] No surgery: antibiotics if held, pain relief, comfort.

Protocol 9. Comfort care when the belly will not be saved - [ ] Opioid if held, at a dose that gives comfort. - [ ] A nasogastric tube to stop vomiting, if available and tolerated. - [ ] Damp cloth for the mouth. Small sips if wanted. - [ ] Propped up or on the side, as the patient prefers. - [ ] No forced fluids. Rectal fluid only if it brings comfort. - [ ] Someone present at all times.

Numbers to carry

1. 36 hours: appendicitis rupture risk rises after this, about 5 per cent per 12 hours (Bickell 2006).
2. 7 in 10: mild appendicitis that avoids surgery at a year with antibiotics. 6 in 10 at five years (APPAC).
3. 1 in 3: recurrence after conservative appendicitis care within five years.
4. 12 hours: perforated ulcer not improving by then needs an operation (Crofts 1989).
5. 48 to 72 hours: the limit of waiting in adhesive obstruction (WHO 2003, Di Saverio 2013).
6. 24 hours: the limit for taxis, and the delay that raised death from stuck hernia elevenfold (Williams 2021).
7. 6 hours: the war-wound window, and a pulse over 120 meant few survived (Scotland 2023).
8. 120: the pulse above which a belly patient is in danger.
9. 250 ml an hour: rectal fluid rate in Bruera's series.
10. 4 to 8 per cent: laparotomy mortality for trained, supervised non-physicians (Bolkan 2017).

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