

# Index

## A

- Action learning process, 133
- Adenosine triphosphate (ATP), 20
- Anaemia, 23–25
- Anaerobic threshold (AT), 20
- Anaesthesia
  - epidural, 42–45
  - local anaesthetic blocks, 100–101
  - protocols, 5
  - spinal anaesthesia, 99–100
- Anaesthetic approach
  - anaesthetist role, 50
  - CO<sub>2</sub> pneumoperitoneum
    - cardiovascular effects, 65
    - head down position, 66
    - pulmonary effects, 66
    - renal effects, 66
  - individualised goal-directed fluid therapy
    - cardiac output and oxygen delivery, 59–61
    - controversy, 62
    - fluid optimisation technique, 59, 60
    - fluid shifts, 58
    - goal-directed therapy, 60, 62
    - individualised goal-directed fluids, 58
    - postoperative fluids, 59
    - stroke volume optimisation, 59
  - laparoscopic surgery
    - vs. open surgery, 63–64, 68
    - physiological consequences, 65
    - ventilation strategy, 67
  - open surgery, 63
    - vs. laparoscopic surgery, 63–64, 68
    - physiological consequences, 64–65
    - ventilation strategy, 66–67
  - postoperative care, 67–68
  - pre-assessment
    - cardiovascular risk reduction, 54
    - functional capacity, 51
    - non-cardiac surgery, cardiac risk index, 51–53
    - peri-operative complications, 54
    - pre-existing disease optimisation, 53
    - surgical risk factors, 50–51
  - secondary complications
    - postoperative chest infection reduction, 68–69
    - venous thromboembolism risk reduction, 69–70
    - wound infection risk reduction, 70
  - stress response modulation, 63
  - surgical preparation
    - anaesthesia, 56
    - anti-microbial prophylaxis, 56
    - hospital admission, 55
    - monitoring and vascular access, 57–58
    - nasogastric tubes, GI surgery, 56
    - peri-operative hypothermia avoidance, 57
    - PONV prevention, 57
    - preoperative preparation, 55
    - urinary drainage, 56–57
  - trimodal approach, 54–55
- Analgesia
  - administration routes, 96
  - epidural analgesia, 96–99 (*see also* Epidural analgesia)
  - metabolic stress response, 42–45
  - methods and regional blocks, 62–63
  - open and laparoscopic surgery, 106
- Angiotensin-converting enzyme (ACE) inhibitors, 28

Angiotensin II (ATII) receptor antagonists, 28  
 Anti-microbial prophylaxis, 56

## B

Beta blockers, 54

## C

Cardiopulmonary exercise testing (CPET), 20, 21  
 Cardiovascular risk assessment  
   aerobic capacity, 20  
   clinical risk indices, 18–19  
   functional capacity, 19–20  
   12 Lead Resting ECG, 21  
   non-invasive stress testing, 21, 23  
   patient history and physical examination, 18  
   perioperative mortality, 20–21  
   risk evaluation and management, 21, 22  
 Chronic obstructive pulmonary disease (COPD), 23  
 Cyclooxygenase (COX) type 2 inhibitors, 103

## D

Diabetes, 28–29  
 Dobutamine stress echocardiography (DSE), 21  
 Doppler-guided fluid management, 82

## E

Elective abdominal surgery failure, 1  
 Enhanced recovery after surgery (ERAS)  
   anaesthetic approach (*see* Anaesthetic approach)  
   anaesthetic protocols, 5  
   auditing, 174  
   barriers and troubleshooting  
     finances and logistical support  
       restrictions, 140  
     inadequate staff numbers, 140–141  
     organisational barriers, 141  
     professional context, 140  
     social barriers, 139–140  
     time pressures and time lack, 140  
   benefits, 121  
   care pathway creation, 136  
   change management principle  
     action learning process, 133  
     plan-do-study-act cycle, 132  
     transformation strategy, 132–133  
   clinical outcomes and monitoring,  
     9–10, 136–137

colorectal surgery, 115–116  
   abdominal and pelvic drainage avoidance, 119  
   anastomotic leak avoidance, 119  
   bladder catheter removal, 119–120  
   epidural analgesia, 116–117  
   goal-directed perioperative fluid administration, 115–116  
   high perioperative oxygen concentration, 116  
   laparoscopic surgery, 118  
   mechanical bowel preparation, 112–113  
   nasogastric tubes avoidance, 119  
   normothermia maintenance, 116  
   patient positioning, 117–118  
   postoperative laxatives, 119  
   rectal cancer recovery, 120  
   single-port surgery, 120–121  
   stoma training, 113, 115  
   transverse incision, 118  
 complications  
   anastomotic leak, 122–123  
   nausea and vomiting, 121–122  
   postoperative ileus, 122  
 cost savings, 135–136  
 data collection  
   Cochrane Review updates, 171–172  
   complexity, 172  
   compliance, 172–174  
   data registration, 172  
   perioperative care quality, 172  
   quality improvement strategies, 172  
 early mobilisation, 7–8  
 early oral intake promotion, 7  
 metabolic conditioning, 4–5  
 metabolic stress response  
   (*see* Metabolic stress response)  
 multidisciplinary team members, 4  
 multimodal pain relief, 6–7  
 pain control (*see* Pain control)  
 patient discharge criteria, 8  
 perioperative fluid management  
   (*see* Intravenous fluid therapy)  
 preadmission information  
   and counselling, 4  
 preoperative fasting, 4  
 principles, 2–3  
 quality improvements, 135–136  
 staff education, 137–139  
 steering group  
   aims of, 134  
   ER facilitator, 134  
   members, 133–134  
   quality improvements, 135–136  
   sub-groups and reports, 134

- success and failure assessment, 159
      - anaesthetic factors, 167–168
      - clinical outcome measures, 160
      - compliance, 161–162
      - functional recovery, 160–161
      - implementation factors, 168–169
      - patient satisfaction, 161
      - physiological factors, 165–166
      - post-operative recovery deviations, 162–164
      - surgical factors, 166–167
    - surgical incisions, 6
    - surgical technique, 5–6
  - Enhanced recovery facilitator
    - care management
      - outpatient clinic, 146–147
      - postoperative recovery, 149, 156–157
      - preadmission clinic, 147
      - recovery, 148–149
      - surgery, 148, 155
      - surgery admission day, 148, 155
    - data collection, 149–150
    - duties and responsibilities
      - clinical practice and practice development, 151
      - financial responsibility, 153
      - professional/education and training role, 152–153
      - research and audit, 152
      - risk management, 153
      - service development and management, 152
    - emergency and assessment ward triage area, 146
    - ER phone management, 145–146
    - ER Programme evaluation, 150
    - ER team meetings, 145
    - job description, 150–151
    - patient discharge information, 145
    - patient documentation creation, 145
    - person specification form, 153–154
    - primary care, 146
    - responsibilities, 143–144
  - Epidural anaesthesia
    - metabolic stress response, 42–45
    - oliguria, 87
    - pain control, 97
  - Epidural analgesia, 5
    - clinical outcomes, 160
    - colorectal surgery, 96–99, 116–117
    - vs. intravenous opioid analgesia, 7
    - low molecular weight heparin, 70
    - mid-thoracic, 85
    - open surgery pulmonary function, 69
    - side effects, 96, 97
    - urinary catheters removal, 120
    - urinary retention, 56
  - Erythropoietin-stimulating agents (ESAs), 25
- F**
- Fluid therapy
    - cardiovascular monitoring, 80–81
    - colorectal cancer, 77
  - ERAS protocol
    - intraoperative, 85–86
    - postoperative, 85–86
    - preoperative, 83–85
  - goal-directed therapy
    - vs. inotrope use, 82
    - oesophageal Doppler-guided fluid management, 82
    - principle, 81
    - stroke volume, 82
  - restrictive/standard/liberal regimens, 78–80
- H**
- Hyperglycaemia, 28, 38, 39, 43
  - Hypertension, 27–28
  - Hyponatraemia, 77, 78
  - Hypotension
    - angiotensin-converting enzyme, 28
    - angiotensin II receptor antagonist, 28
    - epidural analgesia, 97–98
    - oliguria, 86
  - Hypothermia
    - anaesthetic contributions, 57
    - colorectal surgery, 116
    - fluid management, 75
- I**
- Individualised goal-directed fluid therapy
    - anaesthetic approach
      - cardiac output and oxygen delivery, 59–61
      - controversy, 62
      - fluid optimisation technique, 59, 60
      - fluid shifts, 58
      - goal-directed therapy, 60, 62
      - individualised goal-directed fluids, 58
      - postoperative fluids, 59
      - stroke volume optimisation, 59
    - vs. inotrope use, 82
    - oesophageal Doppler-guided fluid management, 82
    - perioperative fluid administration, 115–116

- Individualised goal-directed fluid therapy (*cont.*)  
 principle, 81  
 stroke volume, 82
- Intravenous fluid therapy  
 fluid therapy (*see* Fluid therapy)  
 fluid types, 77  
 inappropriate fluid balance  
 balanced salt solutions, 76  
 cellular level saline, 76  
 fluid restriction, 76  
 salt and water fluctuations, 75  
 sodium and water requirements, 74  
 sodium chloride, 74–75  
 third-space losses, 74
- K**  
 Ketamine, 104–105
- L**  
 Laparoscopic resection, 5  
 Lee index, 18  
 LiDCO system, 81  
 Low molecular weight heparin (LMWH), 70
- M**  
 Magnesium, 105  
 Metabolic equivalent of task (MET), 19  
 Metabolic stress response  
 bowel preparation, 41, 44  
 cancer, 40  
 carbohydrate treatment, 44  
 diabetes, 40  
 epidural anaesthesia and analgesia, 42–45  
 injury, 37–38  
 insulin resistance and complications  
 glucose uptake, 38  
 hyperglycaemia, 38  
 postoperative metabolism, 39  
 protein balance, 39  
 stress-induced insulin resistance, 39  
 surgical stress and fatigue, 38–39  
 tissue healing, 39  
 malnourished patient, 40  
 postoperative oral intake, 45  
 preoperative fasting, 41–42, 44  
 preoperative nutritional support, 40–41  
 preoperative outpatient visit, 43–44
- Morphine, 95  
 Multidisciplinary team members, 4  
 Multimodal pain relief, 6–7
- N**  
 National Institute for Health and Clinical  
 Excellence (NICE), 25  
 Non-steroidal Anti-inflammatory Drugs  
 (NSAIDs), 7, 103  
 Nutritional Risk Score (NRS), 26
- O**  
 Obesity, 27  
 Opioids, 95  
 strong opioids, 101–102  
 weaker opioids, 102–103
- P**  
 Pain control  
 anaesthesia (*see* Anaesthesia)  
 analgesia (*see* Analgesia)  
 beta-blocker, 105  
 COX-2 inhibitor, 103  
 glucocorticoids, 105  
 ketamine, 104–105  
 lidocaine infusions, 104  
 magnesium, 105  
 NSAIDs, 103  
 paracetamol, 103–104  
 practical approach, 106  
 pregabalin, 105
- Paracetamol, 103–104  
 Patient discharge criteria, 8  
 Patient Education and Conditioning  
 of Expectations, 30–32  
 Perioperative fluid management.  
*See* Intravenous fluid therapy  
 Plan-do-study-act (PDSA) cycle, 132  
 Postoperative nausea and vomiting (PONV)  
 anaesthetic contributions, 57  
 ketamine, 104  
 perioperative fluid management, 86
- Preadmission information  
 and counselling, 4
- Pre-assessment, 15  
 anaemia, 23–25  
 cardiovascular risk  
 abdominal surgery, 17  
 adverse events, 17  
 aerobic capacity, 20  
 clinical risk indices, 18–19  
 functional capacity, 19–20  
 incidence, 17  
 laparoscopy, 18  
 12 Lead Resting ECG, 21

- non-invasive stress testing, 21, 23
- patient history and physical examination, 18
- perioperative mortality, 20–21
- risk evaluation and management, 21, 22
- risk factors, 18
- diabetes, 28–29
- hypertension, 27–28
- nutrition, 25–27
- obesity, 27
- pre-assessment clinics, 16
- pulmonary risk, 23
- smoking and high alcohol, 29

Pregabalin, 105

Pulmonary risk, 23

**S**

Spinal anaesthesia, 99–100

Statins, 54

Stress-induced insulin resistance, 39

Surgical incisions, 6

**T**

Traditional peri-operative care, 1

Transoesophageal Doppler (TOD) probes, 81

Transversus abdominis plane (TAP) block, 100–101

**V**

Venous thromboembolism (VTE), 69–70