

Appendix Table 5. Abstracted Data for Eligible Randomized Trials, Continued\*

Author, Year (Reference)	Adverse Effect: Intervention	Adverse Effect: Control	P Value	Conclusion	Study Quality	Comment
Møller et al., 2002 (12)	No data	No data		The smoking cessation program reduced overall postoperative complications, primarily due to a significant reduction in wound complications, and nonorthopedic hospital days in total hip and knee replacement. The rate of PPC was too low to show an effect.	Good	
Berg et al., 1997 (13)	No data	No data		Incidence and duration of residual block occurs significantly more often with pancuronium. Residual block with long-acting pancuronium is associated with more PPCs; residual block with intermediate-acting vecuronium or atracurium is not associated with higher risk for PPCs.	Good	
Norris et al., 2001 (14)	No data	No data		No advantage to epidural analgesia or combined general + regional anesthesia; very few PPCs overall occurred.	Good	
Rigg et al., 2002 (15)	No data	No data		Combined intraoperative general anesthesia and epidural local anesthetic + postoperative epidural local anesthetic was associated with a significantly lower rate of respiratory failure but no difference in 30-d mortality, cardiac complications, or other postoperative morbidity.	Fair	Only 225 of 447 patients assigned to epidural were fully adherent to the epidural protocol (222 protocol violations: no epidural catheter, 29; catheter removed < 72 h after surgery, 190; catheter removed > 72 h after surgery, 3).
Park et al., 2001 (16)	No data	No data		Overall, epidural anesthesia and analgesia was associated with a trend toward less respiratory failure ( $P = 0.06$ ), pneumonia ( $P = 0.15$ ), and major cardiovascular complications ( $P = 0.18$ ). In the subgroup having abdominal aortic surgery, epidural was associated with significantly less respiratory failure ( $P < 0.01$ ) and major cardiovascular complications ( $P = 0.03$ ) and a trend toward less pneumonia ( $P = 0.06$ ). There was no difference in mortality.	Fair	
Fleron et al., 2003 (17)	No data	No data		Intraoperative epidural opioids, compared with intraoperative IV opioids, were not associated with reduced PPCs.	Fair	
Mann et al., 2000 (18)	Postoperative hypotension: 5 patients  Severe hypotension, systolic BP < 78 mm Hg: no patients  Motor blockade: no patients  Abscess or neurologic complication due to epidural: no patients	Postoperative hypotension: no patients  Severe hypotension, systolic BP < 78 mm Hg: no patients  Motor blockade: no patients	0.01  NS  NS	Combined intraoperative general and epidural anesthesia and analgesia with postoperative PCEA was not associated with fewer PPCs compared with general anesthesia alone and postoperative IV PCA.	Poor	Low statistical power
Cuschieri et al., 1985 (19)	Hypotension: 9 patients; urinary tract infection: 4 patients	No data		Intraoperative and postoperative epidural anesthetic may reduce PPCs compared with analgesia with IM morphine.	Poor	Small sample size, not helpful that epidural seemed better than IM morphine because IM morphine is rarely used now. $P$ values were not reported for IV vs. epidural comparisons; we calculated them from the raw data.
Karayiannakis et al., 1996 (20)	3 LC patients converted to OC but were excluded from analysis			LC was associated with a significantly lower incidence and severity of atelectasis compared with OC.	Poor	Analysis was not intention-to-treat; no pneumonia occurred in either group.
Vignali et al., 2004 (21)	10 LCR patients converted to OCR but were included in intention-to-treat analyses			LCR was associated with a nonsignificant trend toward fewer respiratory tract infections.	Good	
Chumillas et al., 1998 (22)				A program of perioperative breathing exercises that included forced expiration, cough, chest expansion exercises and diaphragm mobilization, maximum inspiration for 3–5 s, and early ambulation after surgery was associated with fewer PPCs.	Poor	Low statistical power
Fagevik Olsén et al., 1997 (23)				Intensive chest physiotherapy, compared with none, was associated with fewer PPCs.	Poor	Very weak definition of pulmonary complications; apparently no uniform surveillance protocol.
Hall et al., 1991 (24)				No difference between IS and chest physiotherapy in rate of postoperative pneumonia.	Poor	No routine surveillance protocol for all patients; chest radiography done only on patients suspected of a pulmonary complication (IS, 44%; chest physiotherapy, 43%). No information about amount and intensity of therapy actually received.

Continued on following page

Appendix Table 5—Continued

Author, Year (Reference)	Adverse Effect: Intervention	Adverse Effect: Control	P Value	Conclusion	Study Quality	Comment
Hall et al., 1996 (25)				In low-risk patients, there was no difference in rate of PPCs between IS and DBEs. In high-risk patients, there was no difference between IS and IS combined with chest physiotherapy.	Poor	Both studies by Hall and colleagues seem to have identical methods; some of the methods language is identical, some not. "Presence of clinical signs was determined each day by the attending physician." Chest radiography was done only for suspected complications. Sputum was sent for testing "when the patient produced discoloured sputum." Some surveillance for PPCs was routine (clinical signs), some not (chest radiography, sputum testing). There is no way to tell how many patients from the previous publication were included in the report.
Böhner et al., 2002 (26)	Superficial nose ulcer: 4 (4%)	None (0%)		Nasal CPAP for 12 h after high-risk abdominal vascular surgery was associated with fewer episodes of severe hypoxemia ( $FiO_2 < 70$ mm Hg with $FiO_2 \pm 0.7$ ) and trends toward fewer episodes of pneumonia and respiratory failure.	Good	
VA TPN Cooperative Study Group, 1991 (27)	Major infectious complications: 27/192 (14%)	Major infectious complications: 13/203 (6%)	0.01	Overall, there was no benefit of TPN for preventing pulmonary complications. Overall, TPN was associated with more major infectious complications and more catheter-related complications.	Good	Subgroup analyses suggested mild malnutrition, no benefit; TPN associated with more infections, especially pneumonia and wound infection; severe malnutrition, no increased infection, but significantly fewer noninfectious complications.
	Major noninfectious complications: 32/192 (17%)	Major noninfectious complications: 45/203 (22%)	0.20			
	Noninfectious catheter-related complications: 11/192 (6%)	Noninfectious catheter-related complications: 2/203 (1%)	0.01			
Pacelli et al., 2001 (28)	3 bloating; 4 diarrhea; 4 tube problems; 2 chylous fistula; 1 bleed from jejunostomy	5 transient hypoglycemia; 2 catheter sepsis	0.11	There was no difference between postoperative TEN and TPN in rates of overall complications, pneumonia, respiratory failure, combined pulmonary complications, or adverse events of the 2 interventions.	Good	
Bozzetti et al., 2001 (29)	Distension: 23 (14%)	10 (6%)	0.018	TEN, compared with TPN, was associated with fewer overall, minor, and infectious complications and marginally significantly fewer noninfectious complications but no benefit regarding pulmonary complications. TEN, compared with TPN, was associated with significantly more abdominal distension and cramps but not more diarrhea and vomiting.	Good	
	Cramps: 21 (13%)	8 (5%)	0.012			
	Diarrhea: 13 (8%)	9 (6%)	0.385			
	Vomiting: 4 (3%)	3 (2%)	0.709			
	Total: 56 (35%)	22 (14%)	<0.0001			
Gianotti et al., 2002 (30)	Cramping or bloating: 1) 16, 2) 42; diarrhea: 1) 3, 2) 7; vomiting: 1) 1, 2) 2	Cramping or bloating: 14; diarrhea: 3) 3; vomiting: 3) 2	All NS, except $P < 0.001$ for 2 (perioperative) vs. 1 (preoperative) and 3 (control)	Preoperative and perioperative enteral immunonutrition, compared with no enteral nutrition was associated with fewer infectious complications but no benefit in noninfectious complications, respiratory tract infection, or respiratory failure.	Good	
Sandham et al., 2003 (31)	Overall: 17	Overall: 5	0.016	Perioperative pulmonary artery catheters in high-risk surgical patients did not improve inpatient mortality or reduce the rate of the secondary outcome of pneumonia and was associated with a statistically significantly higher rate of adverse catheter-related events. For unclear reasons, the rate of the secondary outcome of pulmonary embolism was also significantly higher in patients receiving pulmonary artery catheter (8 vs. 0; $P = 0.004$ ).	Good	

\* BP = blood pressure; CPAP = continuous positive airway pressure; DBE = deep breathing exercise;  $FiO_2$  = fraction of inspired oxygen; IM = intramuscular; IS = incentive spirometry; IV = intravenous; LC = laparoscopic cholecystectomy; LCR = laparoscopic colorectal resection; NS = not significant; OC = open cholecystectomy; OCR = open colorectal resection; PCA = patient-controlled analgesia; PCEA = patient-controlled epidural analgesia; PPC = postoperative pulmonary complication; TEN = total enteral nutrition; TPN = total parenteral nutrition; VA TPN = Veterans Affairs Total Parenteral Nutrition.