

Pain management after cardiac procedures

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- ERAS in cardiac surgery
- Minimally invasive cardiac surgery
- Postoperative pain management
- Education

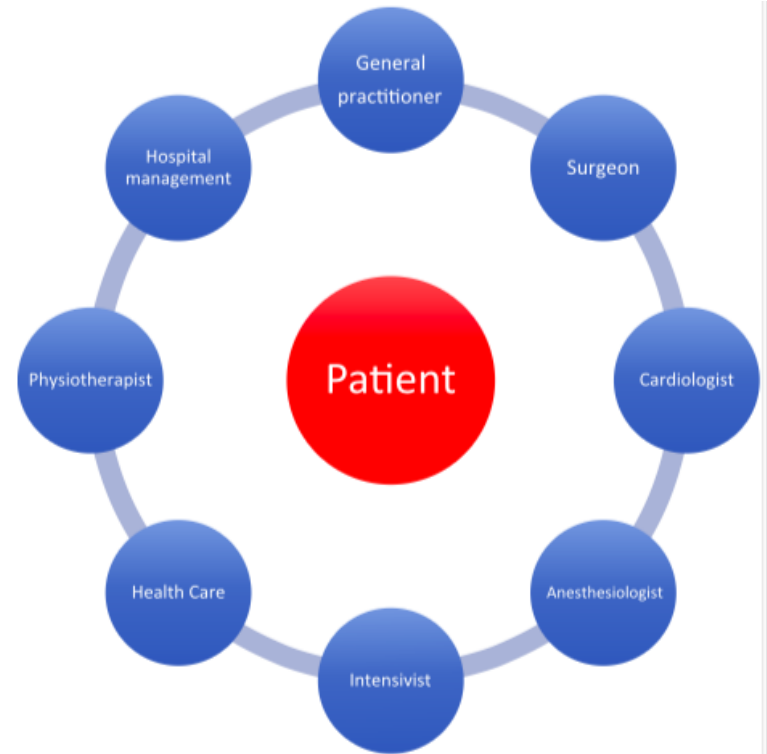
Enhanced recovery after surgery ERAS



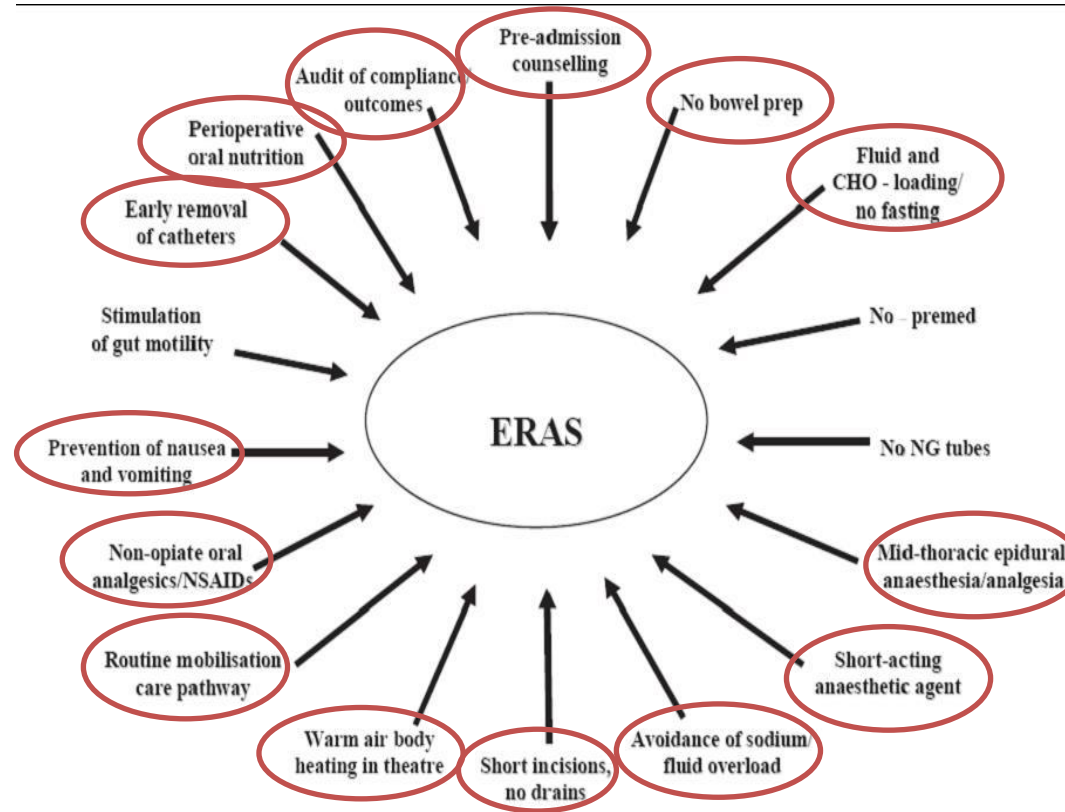
- Henrik Kehlet 1990
- Abdominal surgery
- Multimodal and multy disciplinary approach
- Decrease stress response to the surgery
- Less postoperative complications
- Improve outcomes of surgigal treatment

ERAS and cardiac surgery

- Fast-track anesthesia
- Early extubation
- Risk of respiratory distress and need for reintubation
- Myocardial ischemia
- Patient selection-elderly
- Modification of ICU
- Beginnings in the USA
- Rational use of bed capacity
- Rationalization of personnel
- Rationalization of costs



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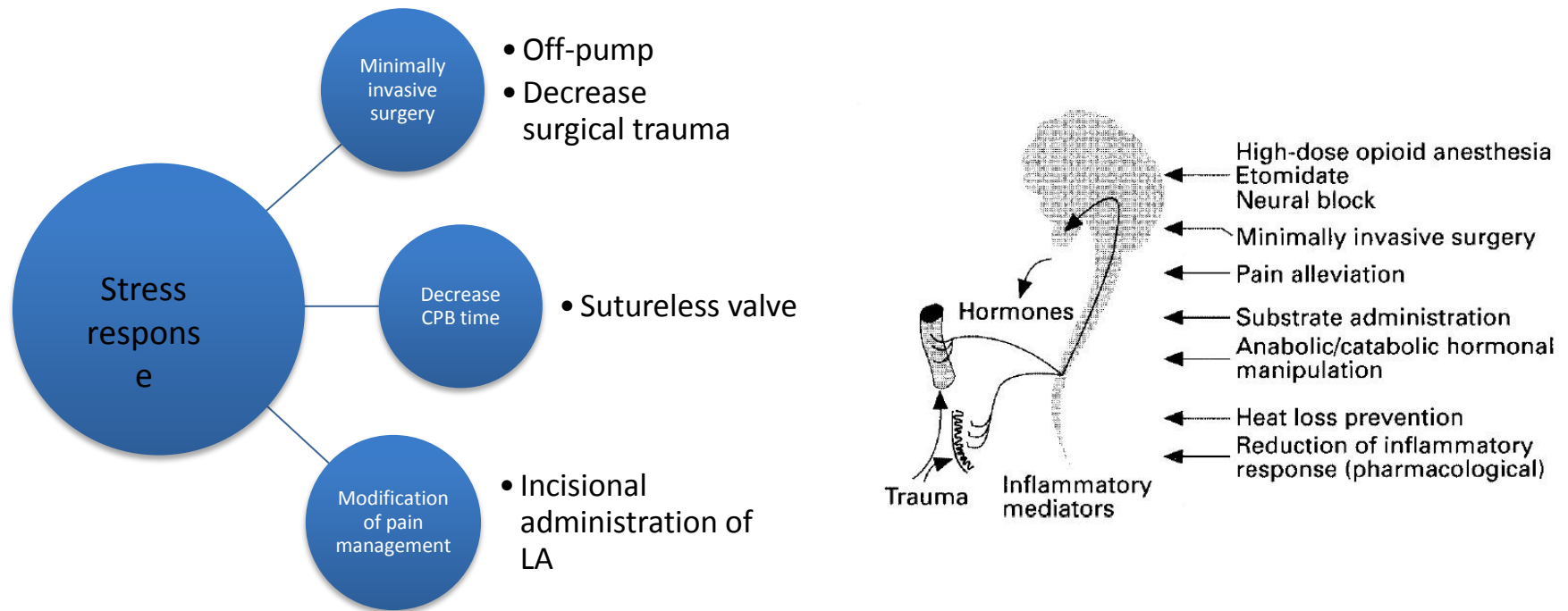


K C H Fearon et al. Clinical Nutrition 2005

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Stress response to the surgery



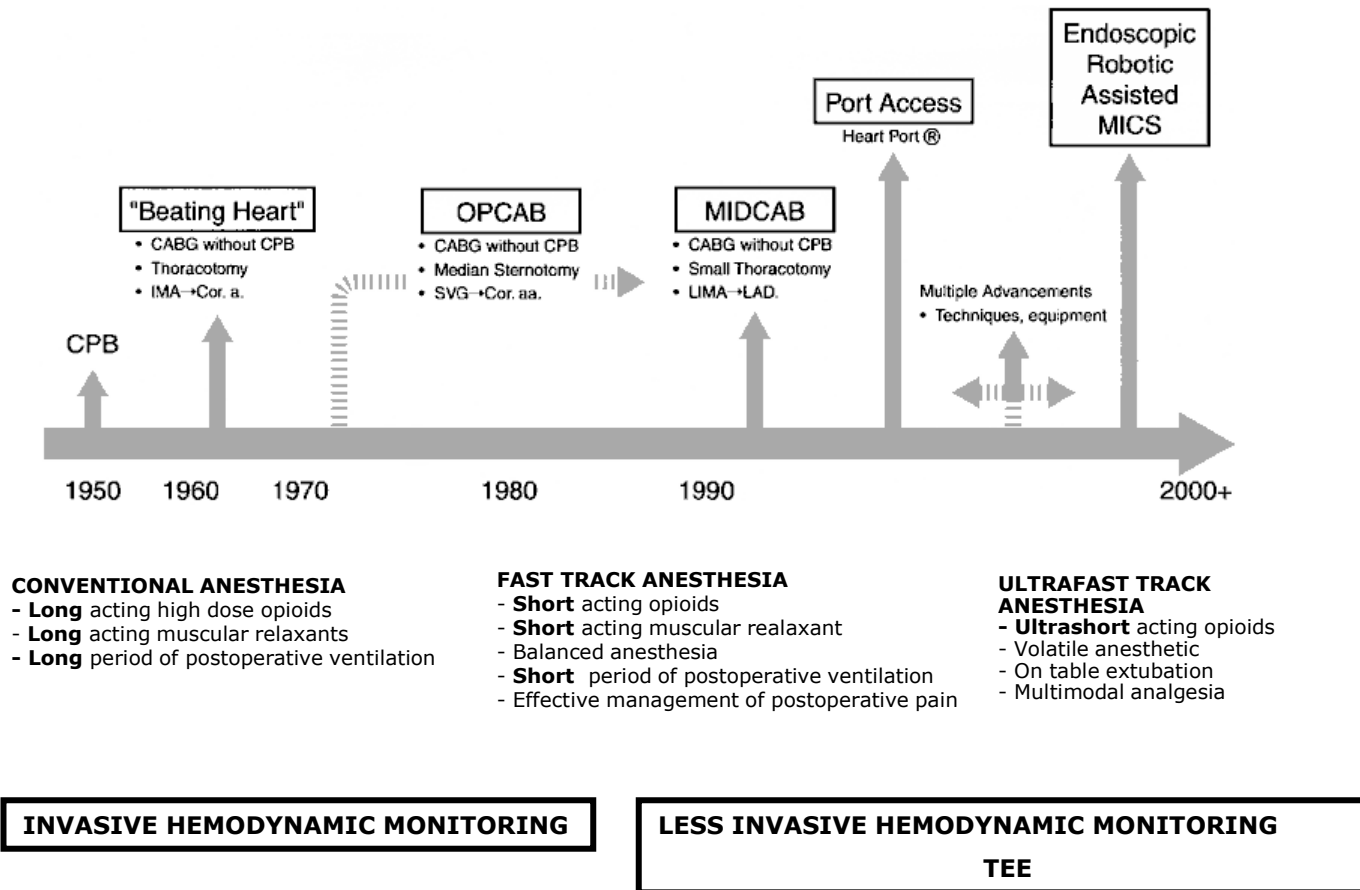
Kehlet, Annals of Surgery, 2008

Matata B. Ann Thorac Surg; 2000

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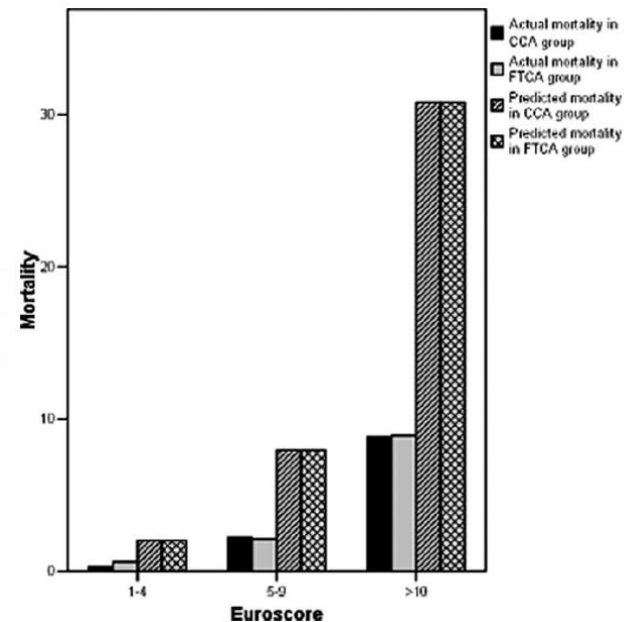


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Fast-Track Anesthesia and Cardiac Surgery: A Retrospective Cohort Study of 7989 Patients

- Comparison fast-track protocol and standard protocol
- Difference in anesthesia technique
- Incidence of mortality, morbidity



Svircevic V, Anesth Analg 2009

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Postoperative complications

	CCA group <i>n</i> =4020	FTCA group <i>n</i> =3969	Crude odds ratio	95% CI	Adjusted odds ratio ^a	95% CI
Myocardial infarction	5.2%	5.5%	1.07	0.84–1.35	0.92	0.71–1.18
Stroke	0.9%	1.3%	1.52	0.98–2.35	1.38	0.86–2.20
Renal failure	0.8%	0.8%	0.95	0.59–1.54	0.64	0.37–1.12

	CCA group <i>n</i> =4020		FTCA group <i>n</i> =3969		Ratio of geometric means (95% CI)	
	Median (10th; 90th)	Geometric mean ^a	Median (10th; 90th)	Geometric mean ^a	Unadjusted ^b	Adjusted ^c
Duration of mechanical ventilation (h)	12 (7–19)	12.2	6 (3–16)	6.7	0.55 (0.53, 0.56)	0.53 (0.51, 0.54)
Duration of ICU hospitalization (h)	22 (18–71)	29.1	23 (18–95)	31.1	1.07 (1.03, 1.11)	1.15 (1.09, 1.21)
Duration of hospitalization (days)	6 (4–13)	6.6	6 (4–18)	7.3	1.10 (1.07, 1.14)	1.09 (1.07, 1.14)

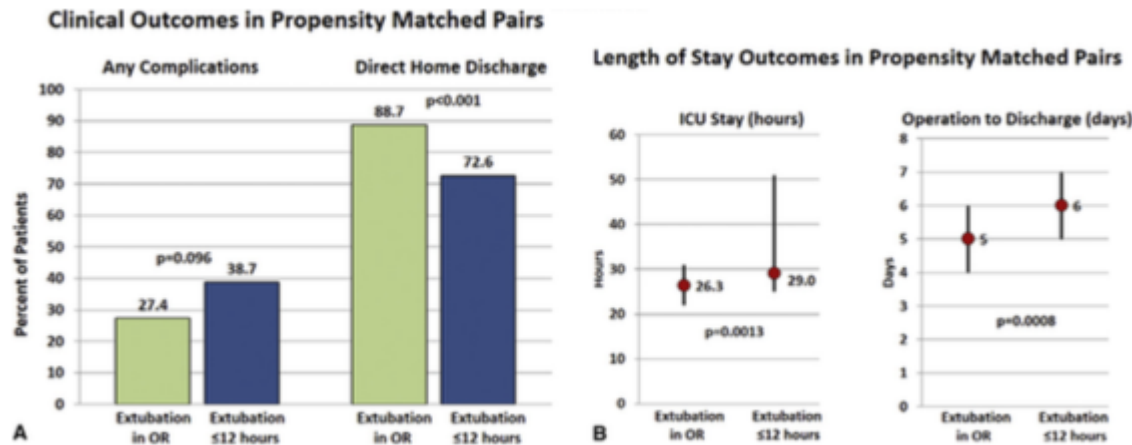
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Extubating in the operating room after adult cardiac surgery safely improves outcomes and lowers costs

Vinay Badhwar, MD, Stephen Esper, MD, Maria Brooks, PhD, Suresh Mulukutla, MD, Regina Hardison, MS, Demetri Mallios, BS, Danny Chu, MD, Lawrence Wei, MD, and Kathirvel Subramaniam, MD



The Journal of Thoracic and Cardiovascular Surgery • Volume 148, Number 6 December 2014

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Predictive factors for ERAS failure in cardiac surgery-patients selection

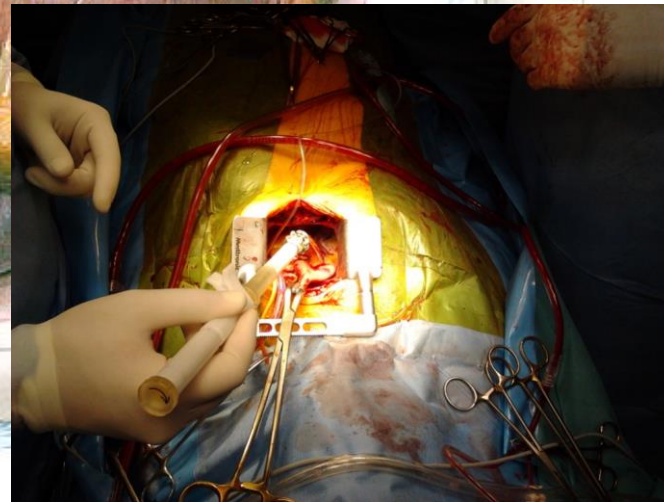
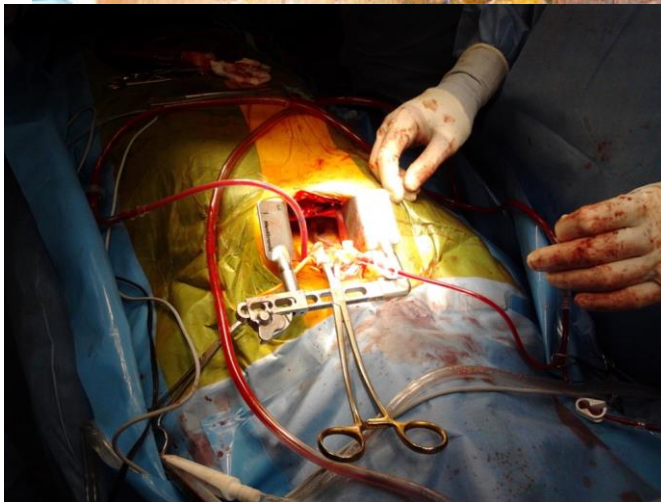
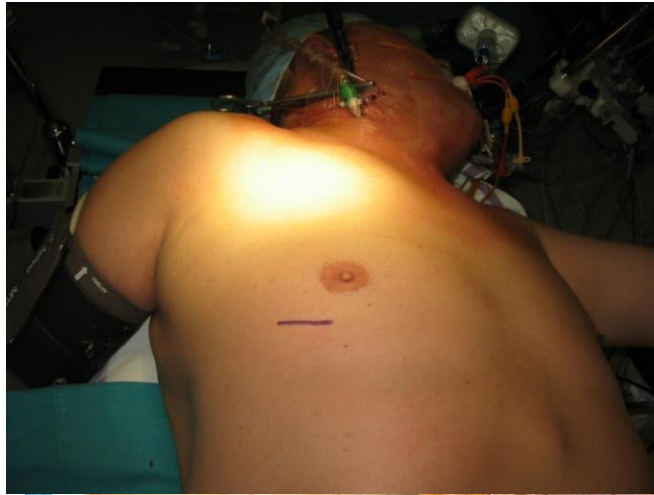
- Preoperative factors
 - Emergency procedure
 - IABP
 - EF < 30%
 - ASA > 3
 - NYHA > 3
 - age
 - GF < 65 ml/min/BSA
- Intraoperative factors
 - CPB time, cross-clamp time
 - Complications
- Postoperative factors
 - Hemodynamic instability
 - Bleeding

Youssefi P, J of Cardiothorac and Vasc Anesth, 2015
Zakhary W, J of Cardiothorac and Vasc Anesth, 2015

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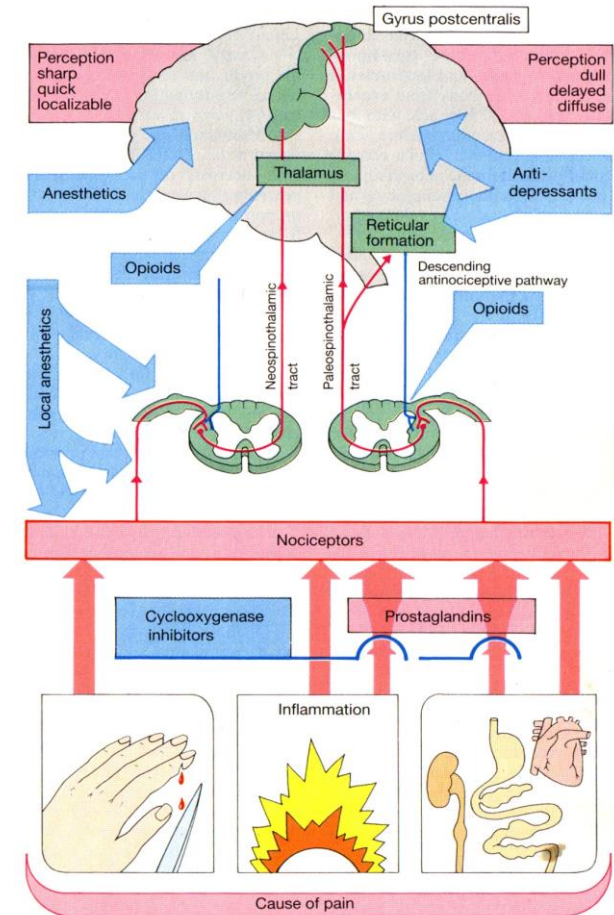
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Multimodal analgesia

- Combination of different classes of analgesics
- Different sites of administration of analgesics
- Reduce adverse effects

Rassmusen 1998

Vintar 2005



Analgesia for cardiac surgery

- Opioids
Sedation, respiratory
depressant effect
- Peripheral or NSAID
- Regional analgesia
Intrathecal
Epidural
Peridural hematoma

Incisional administration of LA

- Wound infiltration with LA
- Placement of catheter in the surgical wound

Sostaric M. The Heart Surg Forum; 2005

Catheter in the surgical wound

- 0.2% Chirocaine
- Elastomeric pump
- Continuous flow
- 2-3 days



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Education

- Patients, relatives
- Postoperative pain treatment
- Postoperative outcome
- Postoperative recovery and rehabilitation

Egber LD, N Eng J Med 1964.
Watt-Watson J, Can J Nurs Res 2000.
Diby M, J Crit Care 2008

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Impact of education and optimism on postoperative outcome

- Evaluation of psychological status preoperatively
- Familiarity with operating procedures

Model	B	SE	β	CI 95%	p
ČUSTVENA BOLEČINA					
Prilagojeno na starost in spol	-0,097	0,043	-0,162	-0,182 do -0,012	0,025
Popolnoma prilagojeno	-0,064	0,047	-0,106	-0,156 do -0,029	0,178
INTENZITETA BOLEČINE					
Prilagojeno na starost in spol	-0,111	0,045	-0,177	-0,199 do -0,023	0,014
Popolnoma prilagojeno	-0,100	0,049	-0,150	-0,196 do -0,004	0,042
KLINIČNI SIMPTOMI					
Prilagojeno na starost in spol	-0,368	0,117	-0,222	-0,598 do -0,138	0,002
Popolnoma prilagojeno	-0,287	0,127	-0,173	-0,537 do -0,036	0,025

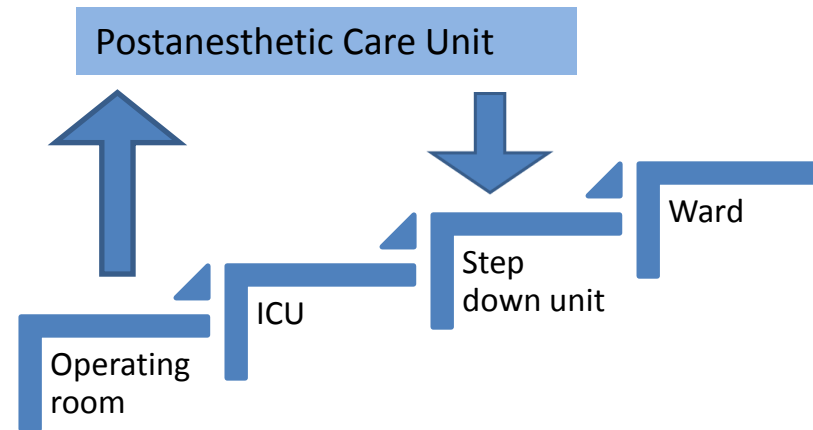
Ronaldson A, J Psychosom Res 2014

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Organization of ICU and ERAS

- Admission to PACU, recovery
- Staff
- Equipment



EnderJ, Anesthesiology 2008
Kiessling AH, J of Cardiothorac Surg 2013
Haanschoten MC, Interact Cardiovasc and Thorac Surg, 2012

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