

**SERVIZIO SANITARIO REGIONALE
EMILIA-ROMAGNA**
Azienda Ospedallero - Universitaria di Ferrara
DIPARTIMENTO CHIRURGICO
Unità Operativa di Clinica Chirurgica



**UNIVERSITÀ
DEGLI STUDI
DI FERRARA**
- EX LABORE FRUCTUS -

Percorsi *Veloci* in Chirurgia Colo-Rettale Oncologica

Carlo FEO

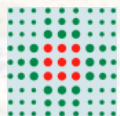
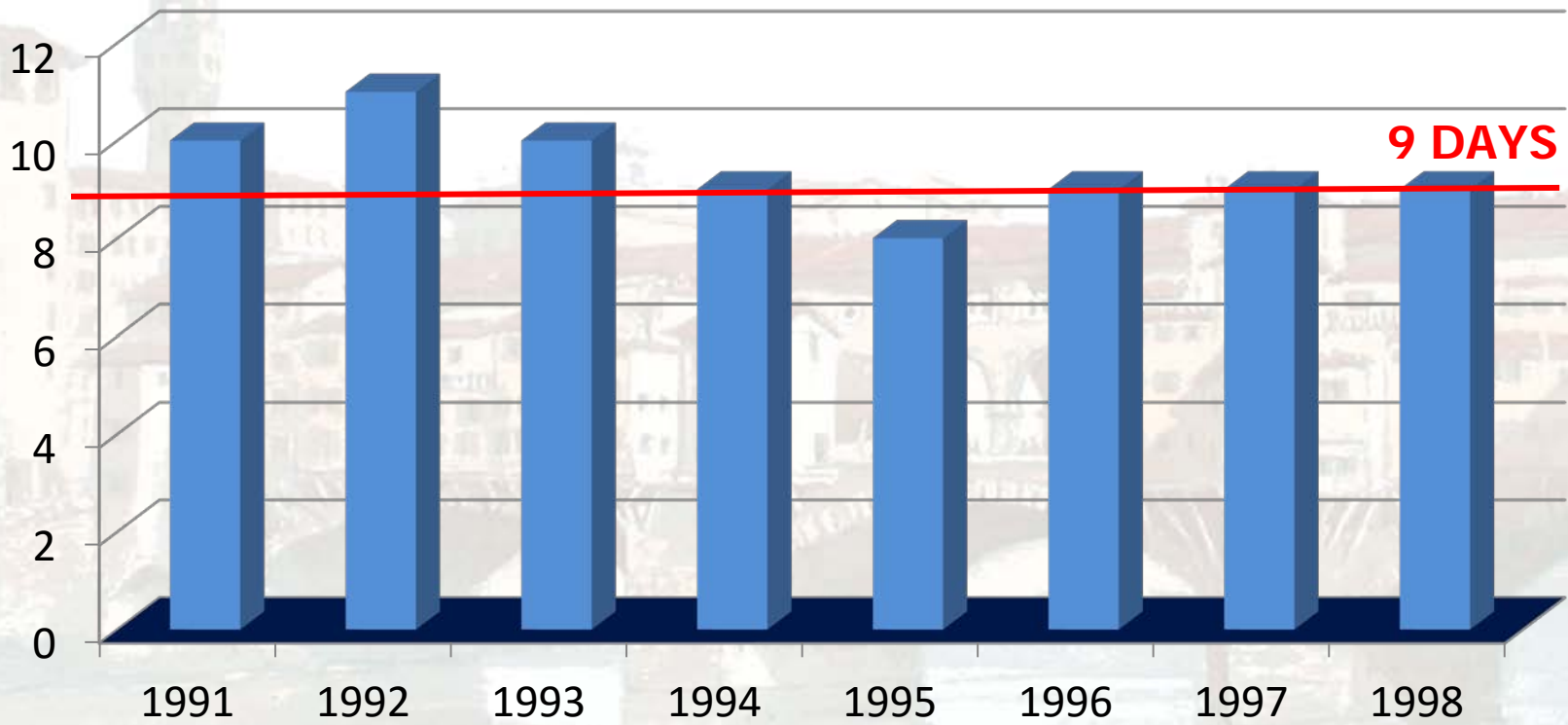
Firenze, 11 novembre 2016



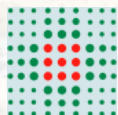
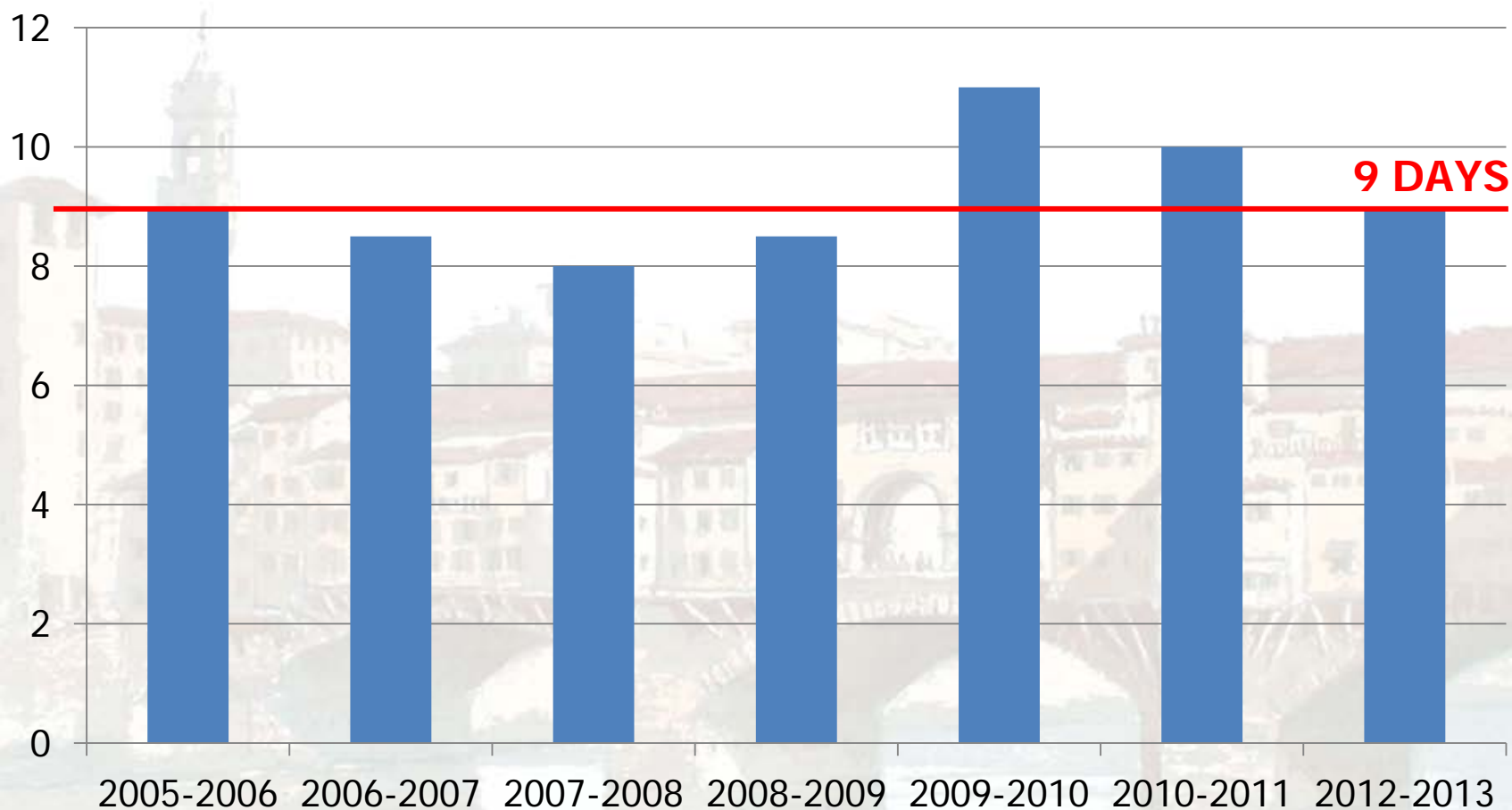
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Historical background

Postoperatative length of hospital stay
in CRC patients between 1991-1998



CRC screenees hospital stay

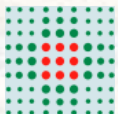


Why is the patient in the hospital?



Henrik Kehlet, Copenhagen (DK)

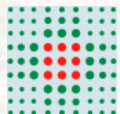
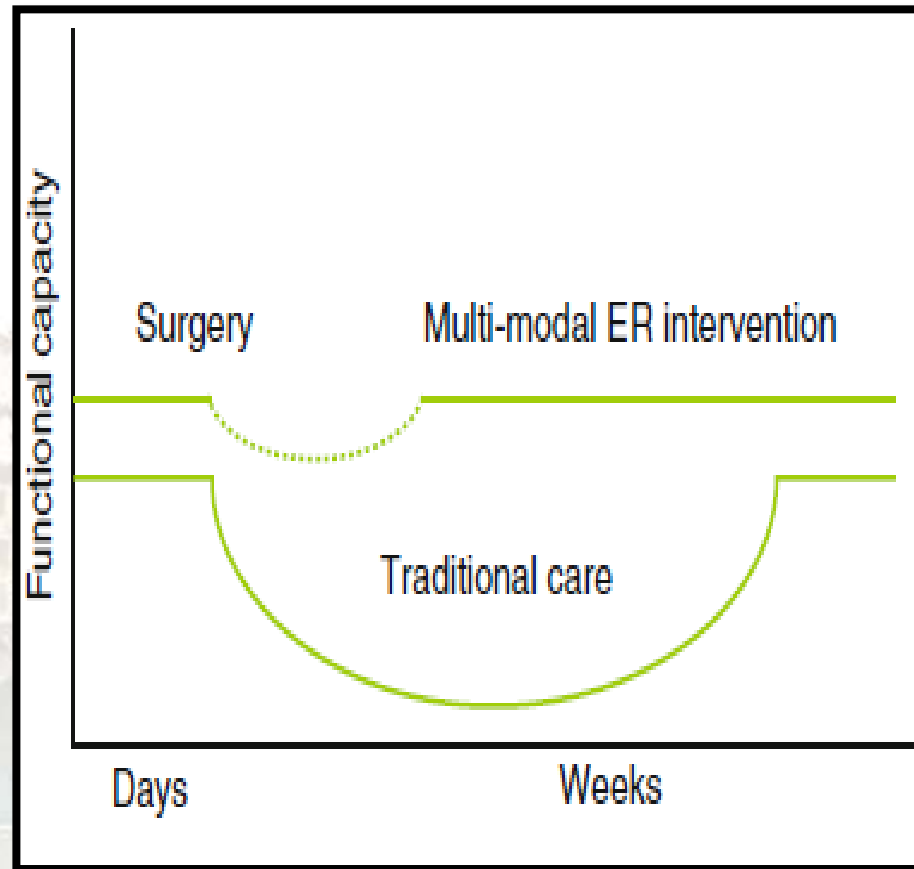
- Parenteral analgesia (persistent pain)
- IV fluids (ileus)
- Bed rest (immobility)





ERAS

Enhanced Recovery After Surgery



Stress chirurgico

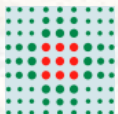
Chirurgia mini-invasiva

Altri interventi:
prevenzione della ipotermia
intraop
ottimizzazione liquidi pre-intraop
carboidrati preop

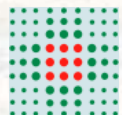
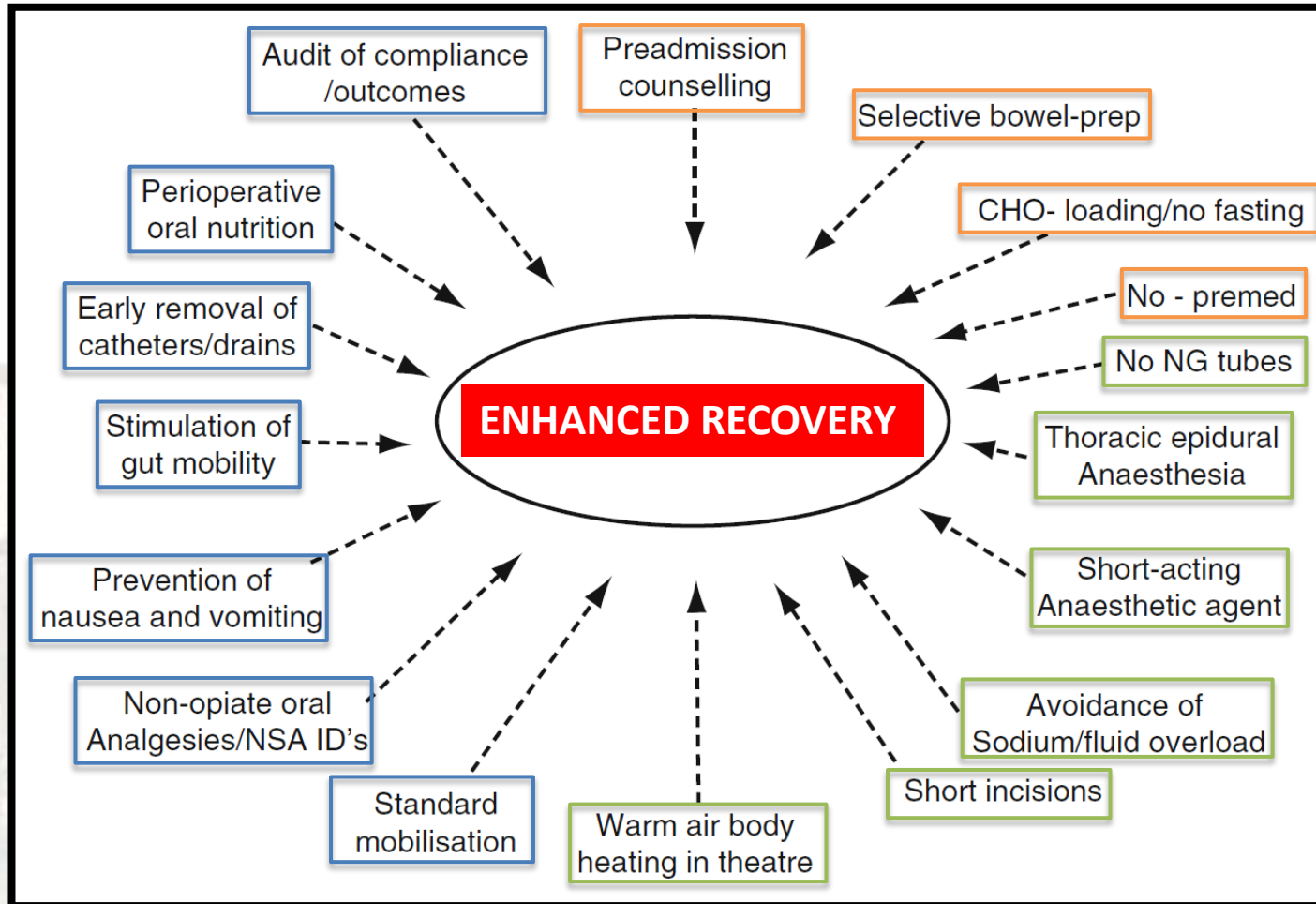
Stress chirurgico:
dolore, catabolismo, immuno-disfunzione,
nausea/vomito, ileo, funzione
polmonare alterata, ↑ richiesta cardiaca,
disfunzione coagulatoria-fibrinolitica,
disfunzione cerebrale, alterazione omeostasi
dei fluidi, disturbi del sonno e fatica

Intrventi farmacologici:
analgesia multimodal e non opioide
glucocorticoidi
statine
B-bloccanti
alfa₂-agonisti
insulina
agenti anabolizzanti
nutrizione
Anestetici locali sistemici

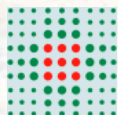
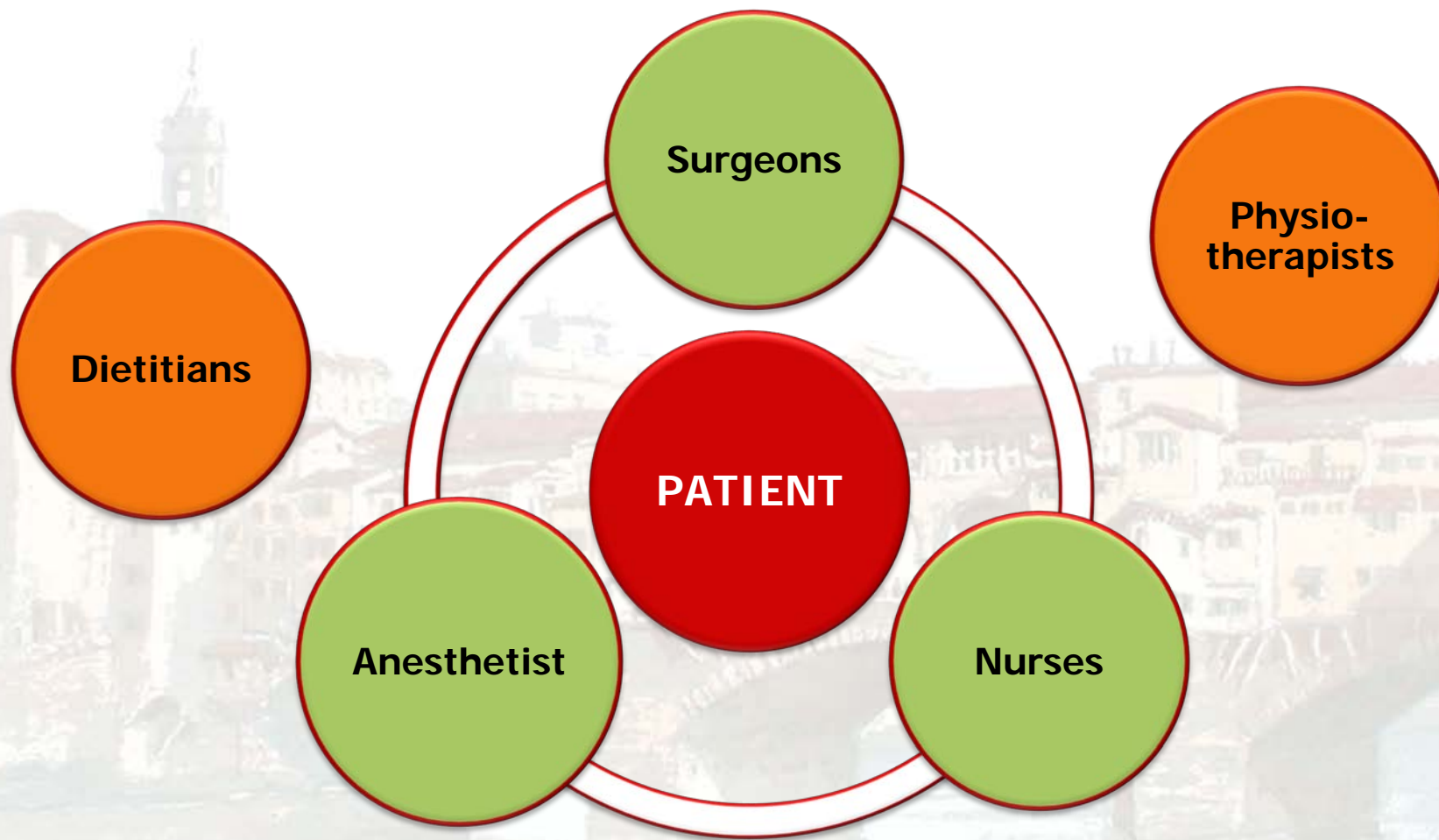
Blocco afferenze nervose:
anestesia da infiltrazione locale,
blocco nervoso periferico,
epidurale,
anestesia analgesia spinale



ERAS protocol

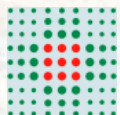


Multidisciplinary team



Aims & Study design

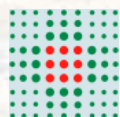
- To evaluate the impact of a colorectal ERAS program on **clinical outcomes** and **institutional costs** in an Italian University Hospital
- **Inclusion criteria:** Elective colorectal resection
- **Exclusion criteria:** Age >80 yo; ASA IV, TNM stage IV, IBD, rectal cancer
- **ERAS group 2013-2016 versus Traditional group 2009-2011**



Study funded by
Ministero della Salute

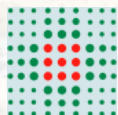
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ERAS element	Traditional group	ERAS group
Preoperative counseling	Informed consent	Extensive w/ booklet
Preoperative fasting	Since midnight	No
Preoperative CHO load	No	Yes
Preoperative bowel prep.	Yes	No
Anesthesia	Long-acting opioid based ± thoracic epidural	Blended (short-acting drugs w/thoracic epidural)
Intraoperative (i.v.) fluids	Liberal	Avoid overhydration
Postoperative pain control	Thoracic epidural or i.v. opioids	POD† 0-2 Thoracic epidural POD ≥3 NSAIDs + paracetamol
Removal of gastric tube	Intestinal activity	In the operating room
Start of liquid diet	Intestinal activity	POD 0-1
Start of solid food	Bowel movements	POD 1
i.v. fluids abolition	Bowel movements	POD 1-2
Removal of Foley catheter	Bowel movements	POD 2
Mobilization	No structured plan	POD 0-1



BASELINE CHARACTERISTICS

	Traditional Group (N=100)	ERAS Group (N=100)	p
Gender			0,321
Male	42	50	
Female	58	50	
Age (years)			0,320
< 65	33	42	
65-74	36	35	
≥ 75	31	23	
Body Mass Index (Kg/m²)			0,621
< 25	47	45	
25-29.9	40	38	
≥ 30	12	17	
American Society of Anaesthesia score			0,026
I	9	2	
II	50	65	
III	41	33	

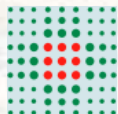


Mann-Whitney test
Chi square test

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INTRAOOPERATIVE CHARACTERISTICS

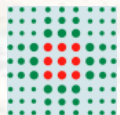
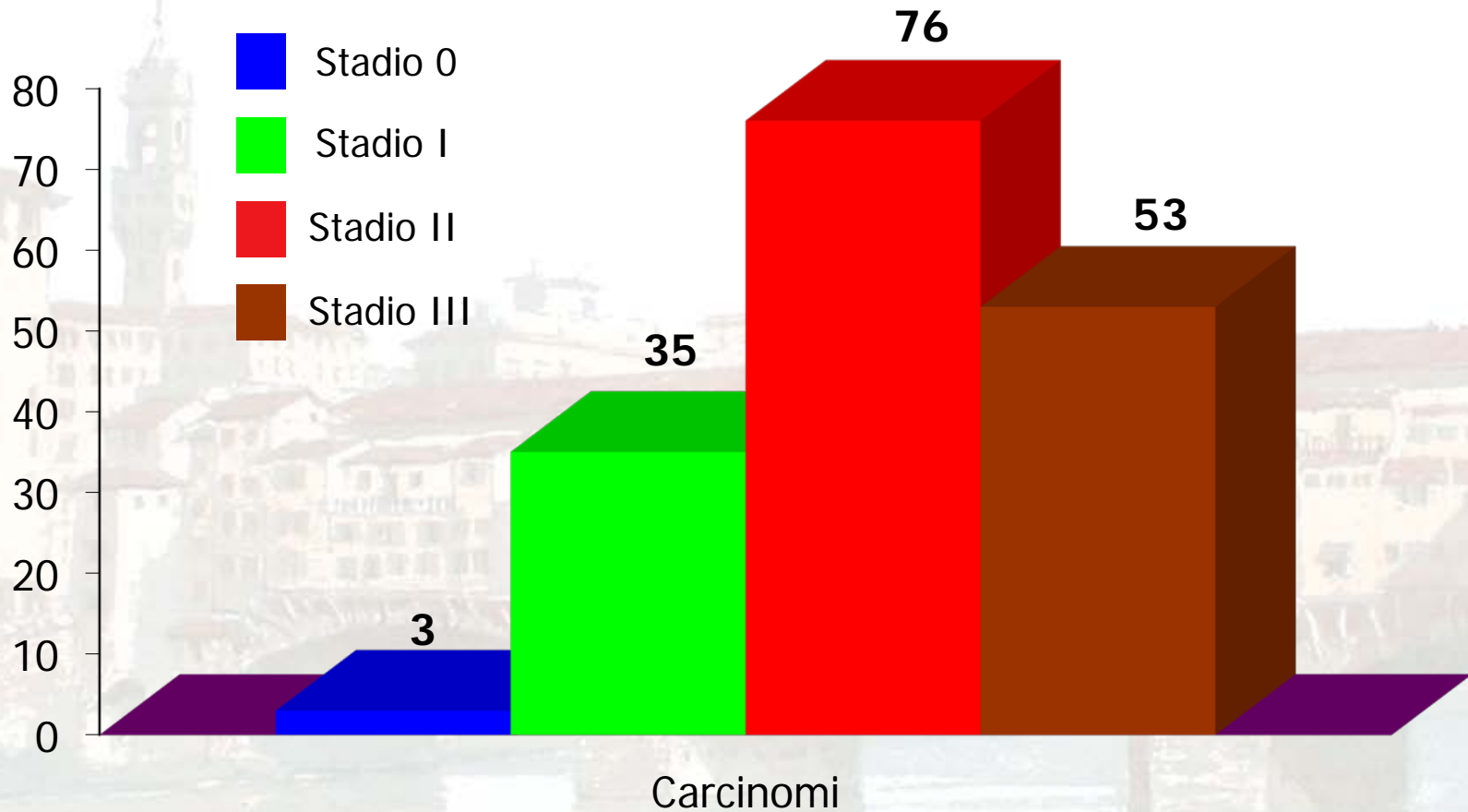
	Traditional Group (N=100)	ERAS Group (N=100)	p
Disease			0,361
Cancer	85	84	
Benign tumor	15	14	
Diverticular disease	0	2	
Type of operation			0,087
Right colectomy	47	50	
Left colectomy	13	15	
Transverse colon resection	5	4	
Sigmoid resection	26	13	
Rectosigmoid resection	3	13	
Segmental resection	5	4	
Sub-total colectomy	1	1	
Surgical approach			< 0,001
Laparotomy	58	5	
Laparoscopy	30	89	
Laparoscopy with conversion	12	6	
Length of procedure (min)*	197,5 (165,0-224,8)	190,0 (165,8-230,0)	0,925



*Median (IQR 25-75)
Chi square, Log-rank tests

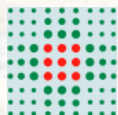
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Postoperative pathology



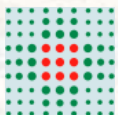
POSTOPERATIVE OUTCOMES

	Traditional Group (N=100)	ERAS Group (N=100)	p
Positioning of			
Central venous catheter	77	5	< 0,001
Epidural catheter	43	91	< 0,001
Nasogastric tube (NGT)	98	5	< 0,001
Drainage	93	57	< 0,001
Vomiting ≤ 24 h	5	10	0,283
Vomiting > 24 h	9	14	0,376
Re-insertion of NGT	6	7	1,000
Resumption of i.v. fluids	5	7	0,767



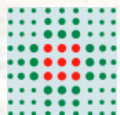
POSTOPERATIVE OUTCOMES

	Traditional Group (N=100)	ERAS Group (N=100)	p
Time to liquid diet (days)	3 (2-4)	1 (1-1)	< 0,001
Time to solid food (days)	5 (5-7)	3 (2-3)	< 0,001
Time to intestinal activity (days)	4 (3-4)	2 (1-2)	< 0,001
Time to bowel movements (days)	5 (4-6)	3 (2-4)	< 0,001
Pain control on oral analgesic (days)	4 (3-5)	3 (3-4)	< 0,001
Postoperative day fit for discharge (days)	7 (6-8)	4 (4-5)	< 0,001
Hospital length of stay (days)	8 (7-9)	4 (4-5)	< 0,001



POSTOPERATIVE OUTCOMES

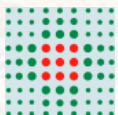
	Traditional Group (N=100)	ERAS Group (N=100)	p
Postoperative complications (Clavien-Dindo)			0,663
Grade I	3	7	
Grade II	22	26	
Grade IIIa	1	1	
Grade IIIb	1	1	
In hospital mortality	0	0	
30 days re-admission	6	3	0,498
30 days mortality	0	0	



Direct cost analysis

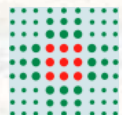
- Costs for:
 - Implementation of the program
 - Preoperative counseling
 - Surgical operation (OR, instruments)
 - Hospitalization (drugs, exams, visits)
 - Re-hospitalization

Variables	Traditional Group (N=100)	ERAS Group (N=100)	P
Total direct costs per patient (euros)	6.796,76 ± 1.381,34	5.339,05 ± 1.909,24	<0,001



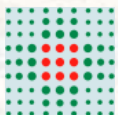
PROLONGED HOSPITAL LENGTH OF STAY

Variable	Unadjusted Model		Full Adjusted Model	
	HR (95% CI)	p	HR (95% CI)	p
Gender (ref: female)				
male	0,99 (0,76-1,32)	0,993	0,89 (0,66-1,19)	0,420
Age (ref: < 65 y)				
65-74	0,81 (0,59-1,13)	0,215	0,80 (0,56-1,12)	0,193
≥ 75	0,72 (0,50-1,02)	0,065	0,75 (0,51-1,10)	0,139
BMI (ref: < 25 Kg/m²)				
25-29,9	1,01 (0,74-1,36)	0,997	1,04 (0,76-1,43)	0,813
≥ 30	1,19 (0,79-1,82)	0,408	1,44 (0,92-2,23)	0,108
ASA score (ref: I)				
II	1,11 (0,60-2,07)	0,735	0,93 (0,47-1,83)	0,833
III	0,80 (0,42-1,51)	0,489	0,77 (0,38-1,53)	0,449
Surgical approach (ref: laparoscopy)				
laparotomy/ laparoscopy with conversion	0,61 (0,46-0,82)	0,001	0,96 (0,66-1,38)	0,811
Perioperative protocol (ref: ERAS)				
traditional	0,43 (0,32-0,58)	< 0,001	0,43 (0,29-0,62)	< 0,001



Conclusions

- Implementing an ERAS program in elective colorectal surgery:
 - Reduced time to functional recovery and postoperative hospital LOS
 - With no increase in morbidity, mortality, and 30-day readmission rate
 - Decreasing in-hospital direct costs
- Being on a traditional perioperative care protocol was the only factor associated to prolonged hospital LOS



Conclusions

- Particular benefit for colorectal cancer screenees
 - Shorter hospital stay
 - Accelerated recovery
 - Shorter convalescence
 - Earlier return to work and social activities
 - Fit for postoperative treatment, if indicated

