HEPMP

HIGHER EDUCATION PAIN MEDICINE PROJECT

Co-funded by the Erasmus+ Programme of the European Union

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Strengthening Capacities for Higher Education of Pain Medicine in Western Balkan countries – HEPMP

LEČENJE POSTOPERATIVNOG BOLA

- **Preporuke za terapiju akutnog bola Američkog udruženja anesteziologa - akutni bol - Post op AB**
  - **„kao bol koji je prisutan kod hirurških pacijenata posle procedure, kao posledica traume izazvane samom procedurom ili komplikacijom u vezi sa procedurom ”**
  - **Najčešće 3 – 5 dana oko 70% na hir odeljenjima**

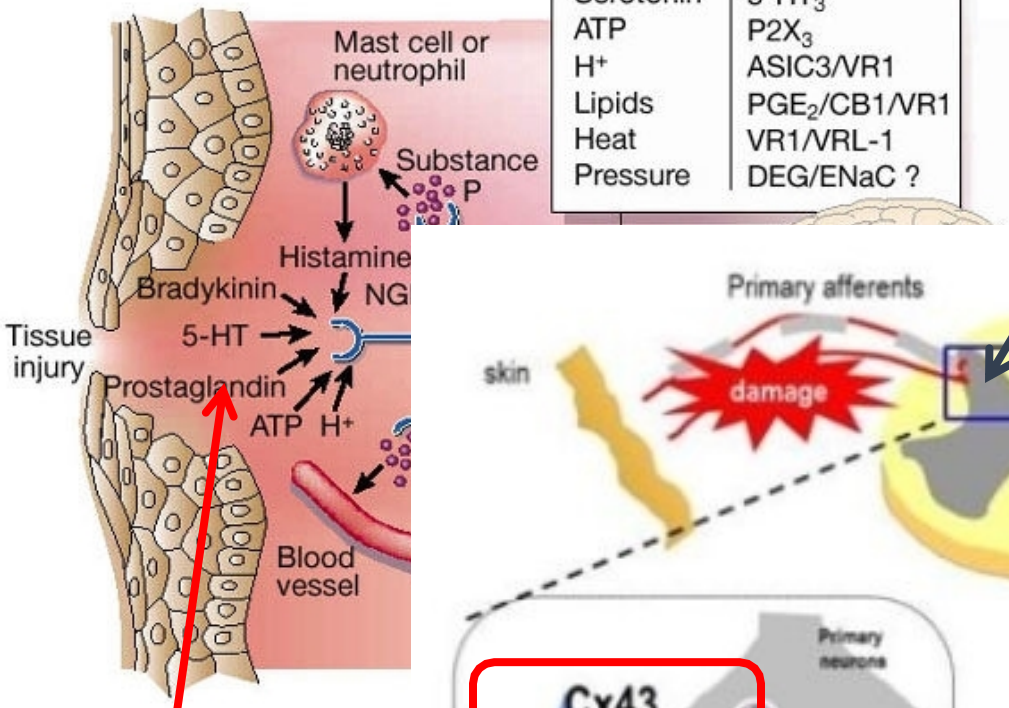
Neurobiologija bola i putevi bola (sažetak)

- Hirurška trauma podstiče oslobađanje:
  - histamina i
  - proinflamatornih medijatora:
    - peptida (bradikinin),
    - lipida (prostaglandini),
    - neurotransmitera (serotonin) i
    - neurotrofina.

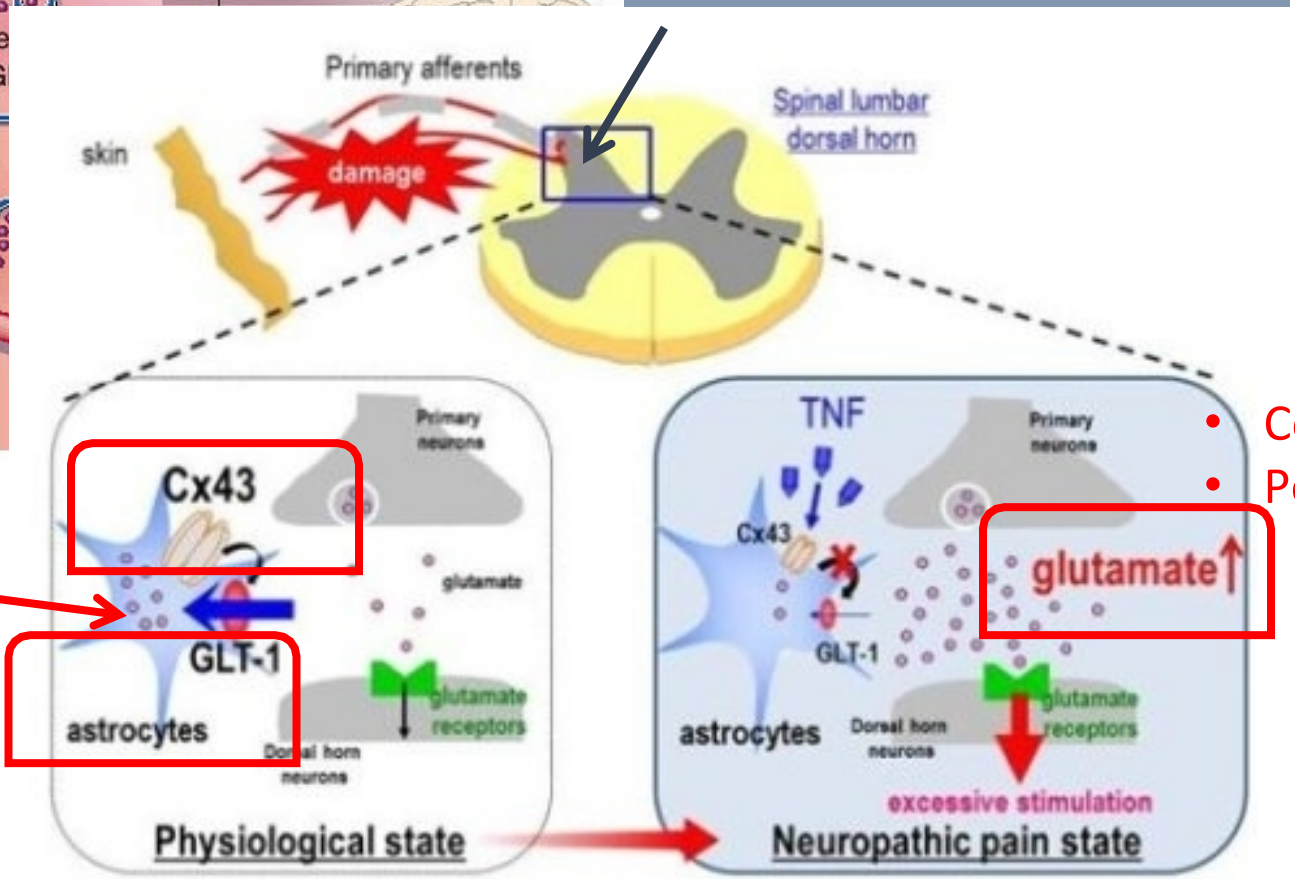
    Oslobođeni proinflamatorni medijatori stimulišu periferne receptore za bol inicirajući transdukciju i transmisiju nociceptivne informacije do CNS-a i proces neurogene inflamacije - oslobađa niz neurotransmitera indukujući perifernu vazodilataciju i redistribuciju volumena u ekstracelularni prostor indukujući time proinflamatorne mehanizme.

Modulacija genske ekspresije
Uvod u Hronični bol

Stimulus	Representative receptor
NGF	TrkA
Bradykinin	BK_2
Serotonin	$5\text{-}HT_3$
ATP	$P2X_3$
H^+	ASIC3/VR1
Lipids	PGE_2/CB1/VR1
Heat	VR1/VRL-1
Pressure	DEG/ENaC ?



TNFα, Il1β, Il6, Citokini



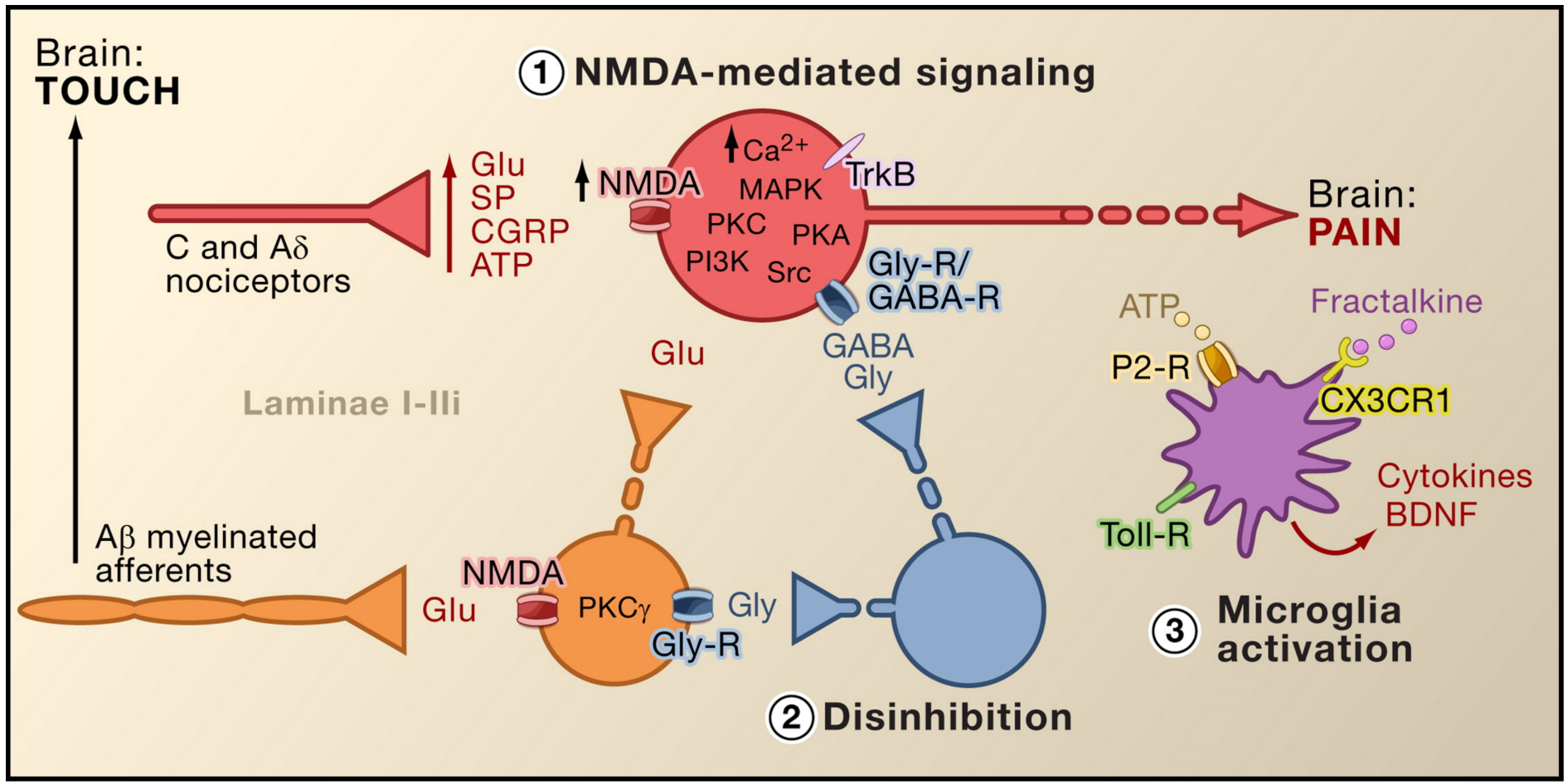
- Centralni
- Periferni
  - NMDA
  - AMPA

Neurobiologija bola i putevi bola (sažetak)

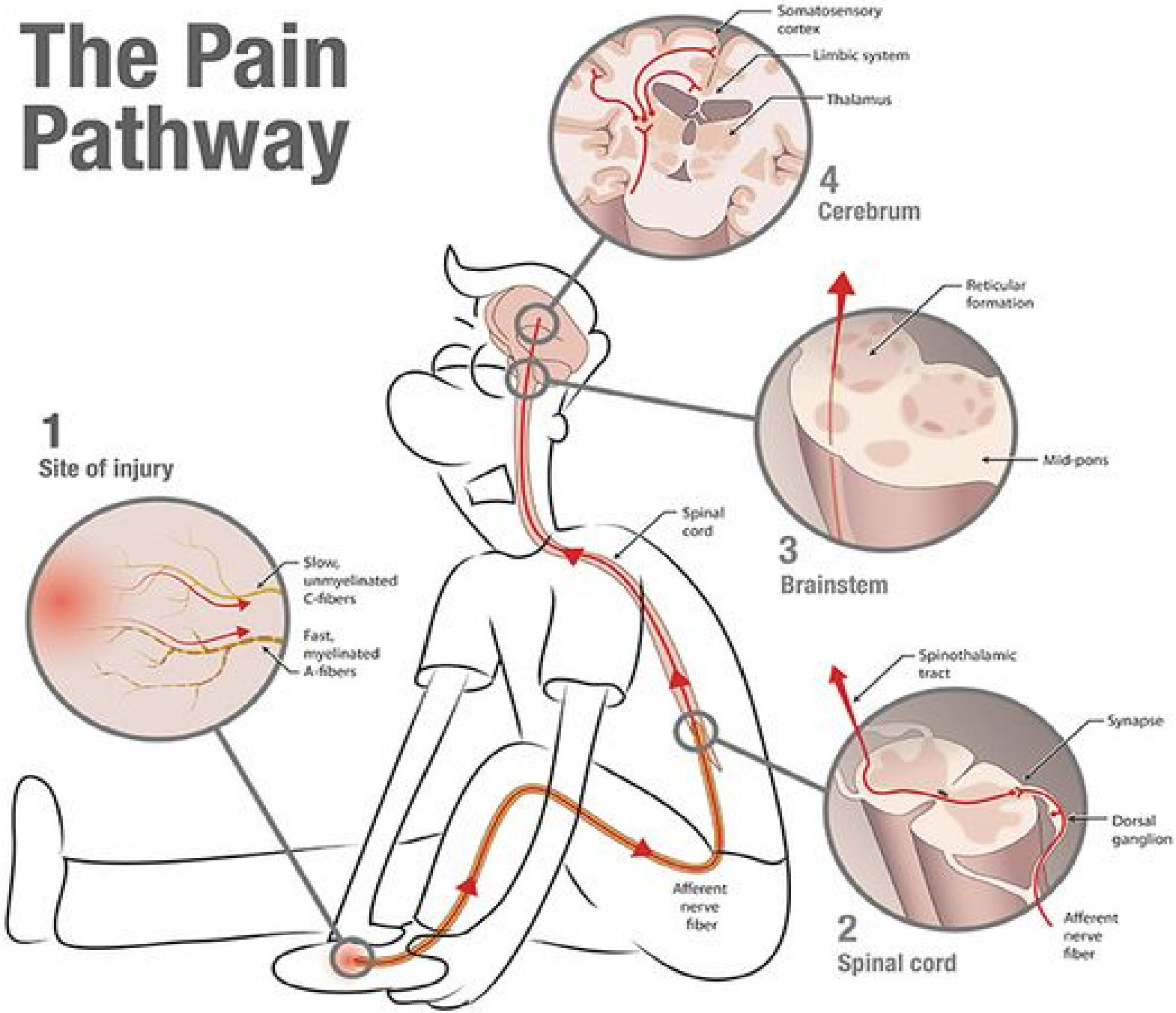
- Najviši nivo integracije ostvaruje se preko spinotalamičkog i spinoretikularnog trakta i kroz osovinu hipotalamus - hipofiza – CNS indukujući suprasegmentalni i kortiklani odgovor, što predstavlja percepciju i afektivnu komponentu bola.

- Niži nivo integracije i modulacije - na nivou kičmene moždine - pravac transmisije odvija se u pravcu ventralnih i ventrobazilarnih korenova uz kompleksnu Modulacija bolnog nadražaja i integracija u nervnom sistemu, - na nekoliko nivoa.

- modulaciju, što može indukovati: povišen tonus skeletnih mišića, sniženi gastrointestinalni motilitet ili inhibiciju funkcije freničnog nerva.

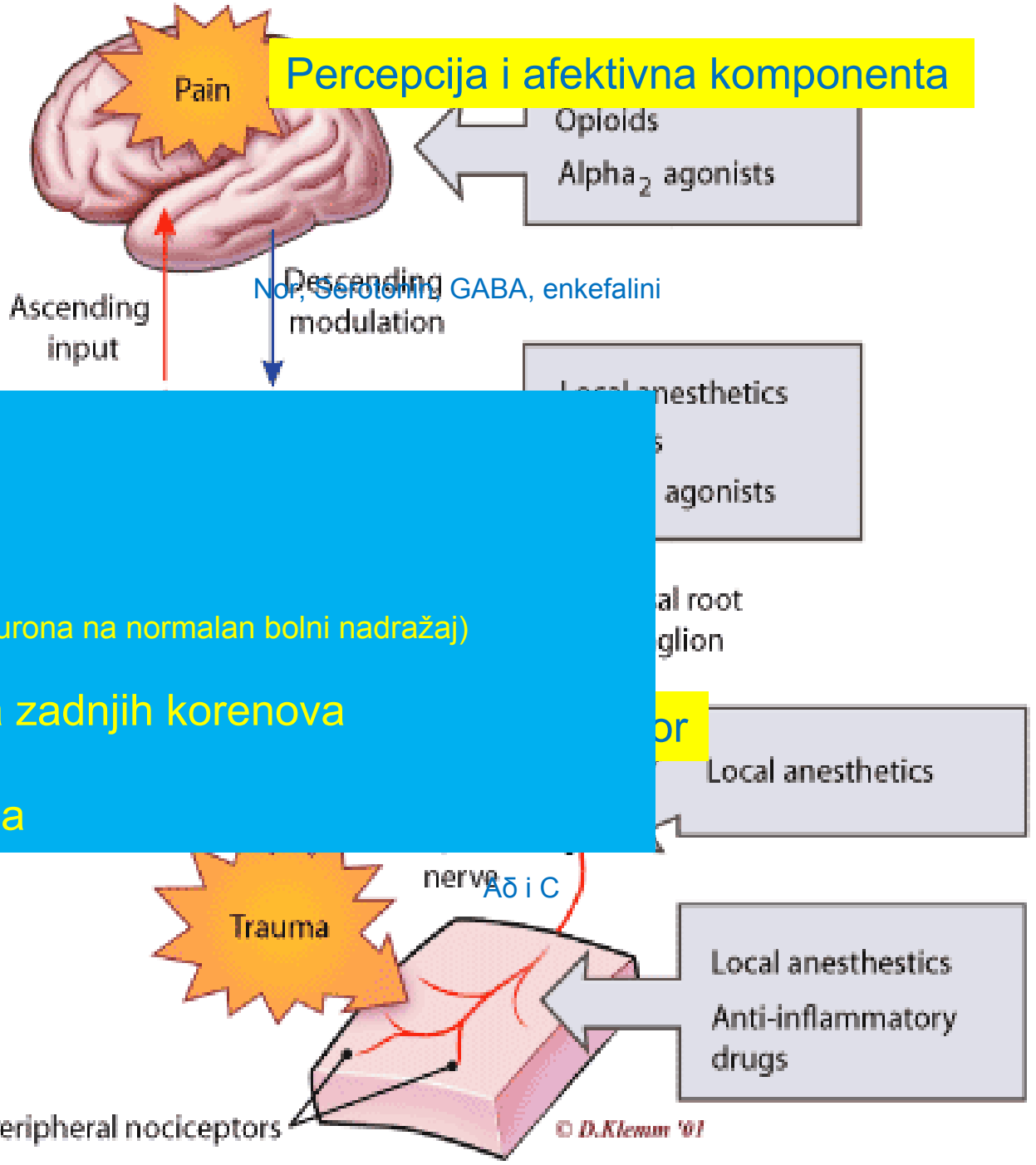

Brain:
TOUCH
① NMDA-mediated signaling
Glu
SP
CGRP
ATP
C and Aδ
nociceptors
NMDA
Ca2+
MAPK
TrkB
PKC
PKA
PI3K
Src
Gly-R/
GABA-R
Brain:
PAIN
ATP
Fractalkine
P2-R
CX3CR1
Cytokines
BDNF
Toll-R
Glu
GABA
Gly
Laminae I-IIi
Aβ myelinated
afferents
NMDA
Glu
PKCγ
Gly
Gly-R
② Disinhibition
③ Microglia
activation

The Pain Pathway



FIZIOLOGIJA BOLA

- RECEPTORI za BOL
- ASCEDENTNI PUTEVI
- DESCEDENTNI PUTEVI
- NEUROTRASMITERI
- TEORIJA VRATA



Produženo delovanje

↓

Centralna senzitacija i Hiperekcitabilnost

(Izražen i Produžen odgovor neurona na normalan bolni nadražaj)

↓

Funkcionalna promena zadnjih korenova

↓

Intenzivniji doživljaj bola

Terapija Akutnog bola

- Strategija
- Koncepcija
  - Pre – Peri Op lečenja
  - Postoperativnog
- Procena bola

Lečenje akutnog postoperativnog bola

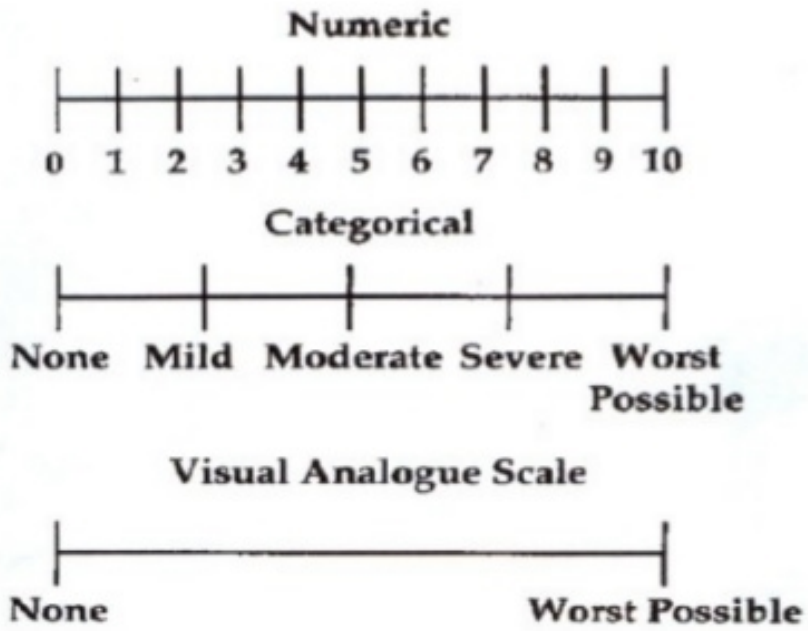
- deo ukupnog anesteziološkog koncepta i strategije
- započinje pripremom bolesnika za anesteziju i uvodom u anesteziju.
- Strategija zasnovana na
  - preoperativnoj pripremi i proceni bolesnika,
  - vrsti operacije (urološka, ortopedska, abdominalna..),
  - hitnosti procedure (urgentna, neodložna ili elektivna) i
  - njenom obimu

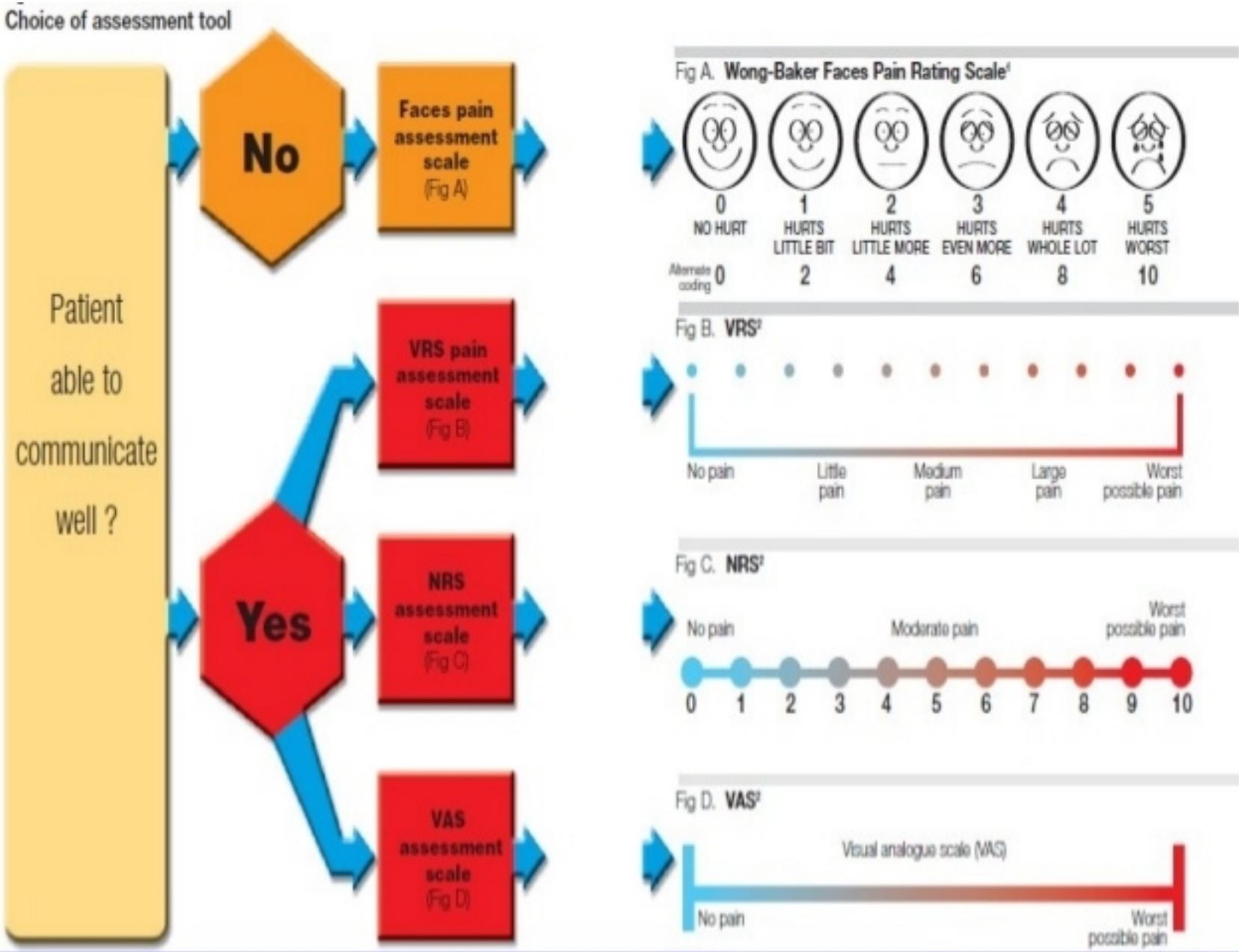
Intraoperativni poremećaji

- Hemodilucija
- Hipotermija
- Promena onkotskog pritiska krvi
- Mehaničko oštećenje i disfunkcija korpuskularnih elemenata krvi
- Aktivacija zapaljenjskog odgovora – SIRS
- Respiratorni distres
- Potencijalna mogućnost globalne i regionalne hipoperfuzije

Postoperativno lečenje

- **Cilj ?**
  - Hemodinamska stabilnost
    - Nadoknada krvi, krv. derivata, infuz. rastvora
    - Invazivni monitoring
    - Kontrola i korekcija poremećaja koagulacije
  - Analgezija
  - Zagrevanje bolesnika
  - Optimalna ventilacija i oksigenacija
    - CMV
    - MMV
    - Spontano disanje


Numeric
0 1 2 3 4 5 6 7 8 9 10
Categorical
None Mild Moderate Severe Worst Possible
Visual Analogue Scale
None
Worst Possible


Choice of assessment tool
Patient able to communicate well ?
No
Faces pain assessment scale (Fig A)
Yes
VRS pain assessment scale (Fig B)
NRS assessment scale (Fig C)
VAS assessment scale (Fig D)
Fig A. Wong-Baker Faces Pain Rating Scale
0 NO HURT
1 HURTS LITTLE BIT
2 HURTS LITTLE MORE
3 HURTS EVEN MORE
4 HURTS WHOLE LOT
5 HURTS WORST
Alternate coding 0 2 4 6 8 10
Fig B. VRS
No pain
Little pain
Medium pain
Large pain
Worst possible pain
Fig C. NRS
No pain
Moderate pain
Worst possible pain
0 1 2 3 4 5 6 7 8 9 10
Fig D. VAS
Visual analogue scale (VAS)
No pain
Worst possible pain

Critical Care Pain Observation Tool* (CPOT)

Medscape® www.medscape.com

Indicator	Description	Score	
Facial expression	No muscular tension observed	Relaxed, neutral	0
	Presence of frowning, brow lowering, orbit tightening, and levator contraction	Tense	1
	All of the above facial movements plus eyelid tightly closed	Grimacing	2
Body movements	Does not move at all (does not necessarily mean absence of pain)	Absence of movements	0
	Slow, cautious movements, touching or rubbing the pain site, seeking attention through movements	Protection	1
	Pulling tube, attempting to sit up, moving limbs/ thrashing, not following commands, striking at staff, trying to climb out of bed	Restlessness	2
Muscle tension Evaluation by passive flexion and extension of upper extremities	No resistance to passive movements	Relaxed	0
	Resistance to passive movements	Tense, rigid	1
	Strong resistance to passive movements, inability to complete them	Very tense or rigid	2
Compliance with the ventilator (intubated patients)	Alarms not activated, easy ventilation	Tolerating ventilator or movement	0
	Alarms stop spontaneously	Coughing but tolerating	1
OR	Asynchrony: blocking ventilation, alarms frequently activated	Fighting ventilator	2
Vocalization (extubated patients)	Talking in normal tone or no sound	Talking in normal tone or no sound	0
	Sighing, moaning	Sighing, moaning	1
	Crying out, sobbing	Crying out, sobbing	2
Total, range			0-8

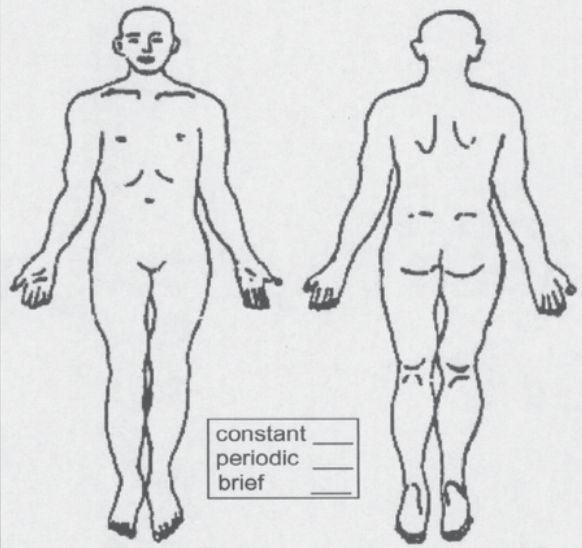
*CPOT range = 0 – 8, CPOT > 3 is significant

McGill – Melzack Pain Questionnaire

Patient's name_____ Date_____ Time_____ am/pm
Analgesic(s)_____ Dosage_____ Time Given_____ am/pm
Analgesic(s)_____ Dosage_____ Time Given_____ am/pm
Analgesic Time Difference (hours): +4 +1 +2 +3
PRI: S_____ A_____ E_____ M(S)_____ M(AE)_____ M(T)_____ PRI (T)_____
(1-10) (11-15) (16) (17-19) (20) (17-20) (1-20)

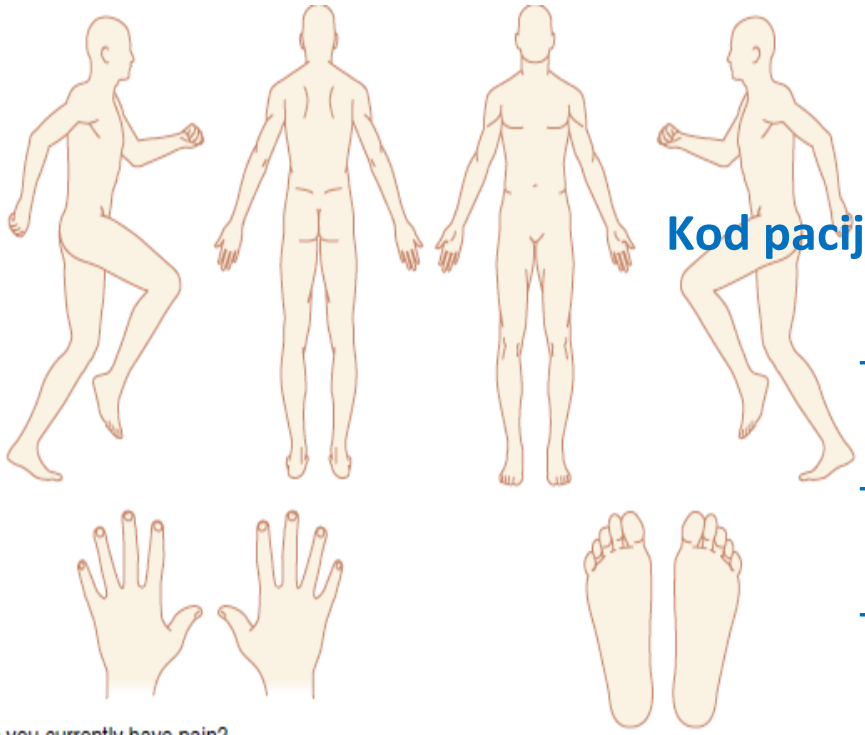
1 flickering	11 tiring	
quivering	exhausting	
pulsing	12 sickening	
throbbing	suffocating	
beating	13 fearful	
pounding	frightful	
2 jumping	terrifying	
flashing	14 punishing	
shooting	gruelling	
3 pricking	cruel	
boring	vicious	
drilling	killing	
stabbing	15 wretched	
lancinating	blinding	
4 sharp	16 annoying	
cutting	troublesome	
lacerating	miserable	
5 pinching	intense	
pressing	unbearable	
gnawing	17 spreading	
cramping	radiating	
crushing	penetrating	
6 tugging	piercing	
pulling	18 tight	
wrenching	numb	
7 hot	drawing	
burning	squeezing	
scalding	tearing	
searing	19 cool	
8 tingling	cold	
itchy	freezing	
smarting	20 nagging	
stinging	nauseating	
9 dull	agonizing	
sore	dreadful	
hurting	torturing	
aching	PPI	
heavy	0 no pain	
10 tender	1 mild	
taut	2 discomforting	
rasping	3 distressing	
splitting	4 horrible	
	5 excruciating	

PPI_____ Comments:



constant ___
periodic ___
brief ___

accompanying symptoms:	Sleep:	Food intake:
nausea ___	good ___	good ___
headache ___	fitful ___	some ___
dizziness ___	can't sleep ___	little ___
drowsiness ___	Comments:	none ___
constipation ___		Comments:
diarrhea ___		
Comments:	Activity:	Comments:
	good ___	
	some ___	
	little ___	
	none ___	



Do you currently have pain?

☐ Yes ☐ No If Yes, location: _____

Character: ☐ sharp ☐ throbbing ☐ dull ☐ burning

Duration: _____

Frequency: _____

Intensity scale: _____

☐ Numeric

☐ Faces

What makes the pain better? _____

What makes the pain worse? _____

What is an acceptable pain level to you? _____

Kod pacijenata sa pre Op bolom

- optimizirati medikaciju

- objasniti prednosti bloka, regionalne A

- planirati adjuvantnu terapiju

- plan post Op multimodalnog pristupa

- ne ukidati postojeću Th (NSAIDs ili COX2 inhibotire) po potrebi konvertovati

Efekti post Op bola

- Akutni
  - Kostimulator SIRS-a
  - Hipotalamus-hipofiza-nadbubreg
  - ↑ Nor; korizola, aldosterona, ADH ...
  - ↑ Glukoze, ketona, laktata, proinflamatornih medijatora
  - Prokoagulantni efekat
  - Retencija Na i vode; edem
  - Aktivacija SNS
    - Usporen enteralni motilitet
    - Izražen hemodinamski odgovor
  - Inhibicija spinalnih refleksa
    - Frenikus – usporen respiratorni oporavak
- Hronični

Akutni perioperativni bol i efekti

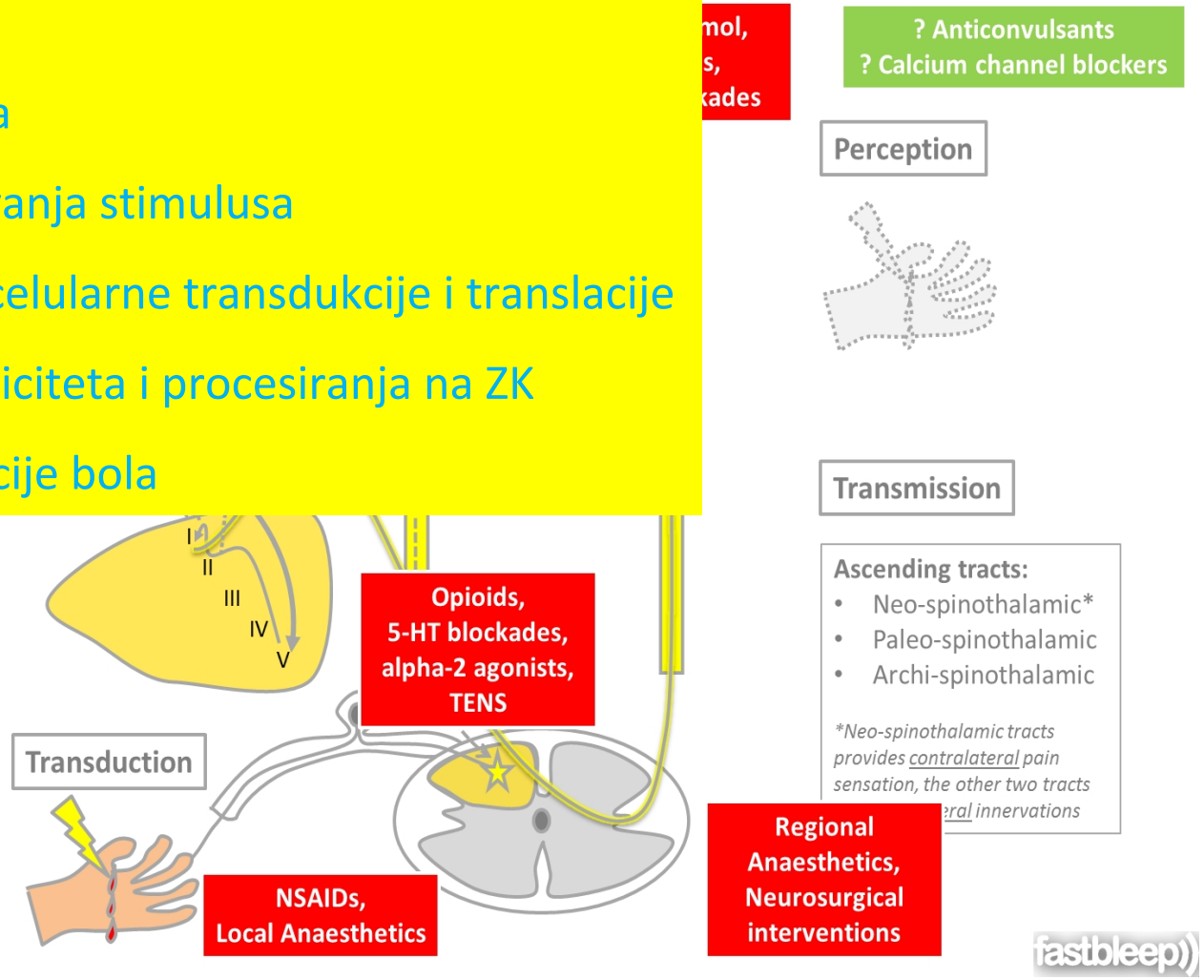
- Efekasna Peri OP Terapija Bola
  - ↓ odgovor na stres,
  - inhibira simpatički odgovor
  - Inhibira spinalne reflekse
  - ↓ smanjujući Mb i Mo
  - poboljšanje kvaliteta života posle operacije.

Terapija AB

Visokog potencijala

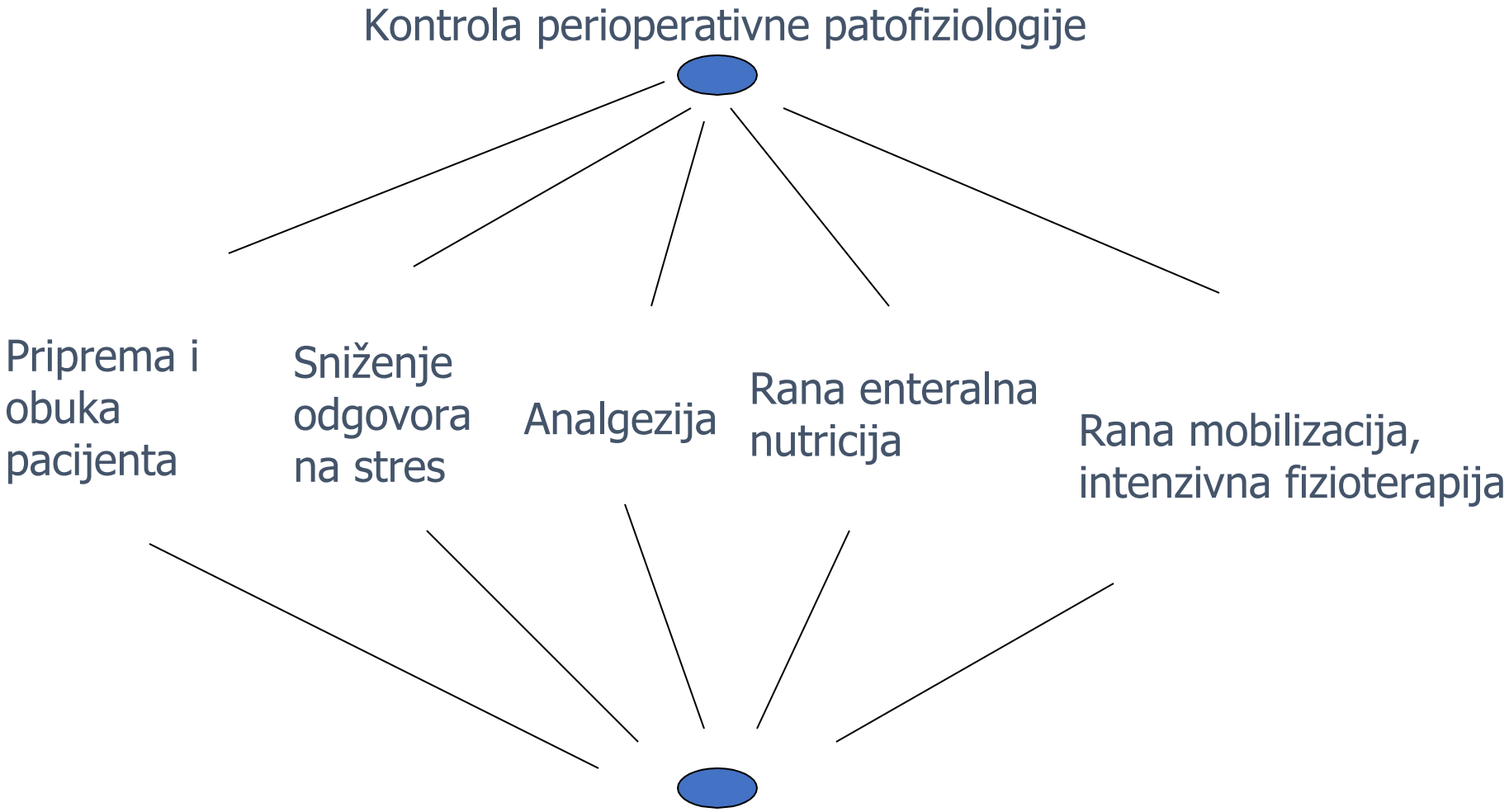
Zasnovana na:

- Prevenciji uzroka
- Modulaciji delovanja stimulusa
- Modilacija intracelularne transdukcije i translacije
- Modulacija plasticiteta i procesiranja na ZK
- Modulacija afekcije bola



Multimodalni i multiprofesionalni koncept

Deo ukupne strategije lečenja



Preventivna analgezija

Pre-emptive analgesia is a treatment that is initiated before and is operational during the surgical procedure in order to reduce the physiological consequences of nociceptive transmission provoked by the procedure.

Owing to this ‘protective’ effect on the nociceptive pathways, pre-emptiveanalgesia has the potential to be more effective than a similar analgesic treatment initiated after surgery. Consequently, immediate postoperativepain may be reduced and the development of chronic pain may be prevented..

British Medical Bulletin 2004; 71: 13–27

Bol – aktivnost SNS

- modulacija odgovora na stres -

- Tahikardija – S/D odnos → koronarna perfuzija
- Hipertenzija → ↑ opterećenje (rad) LK
- → ↑ vazokonstrikcija – aktivacija Tr (↑agregacija, adhezija.... Hiperkoagulabilnost ...
- → ↑ endokrini odgovor – kateholamini- angiotenzin - → ↑ retencija vode i elektrolita – edem → ↑ laktat...
- → ↑ katbolizam – usporen post Op oporavak
- Poremećaj ventilacije i razmene gasova... → ↑ rad disanja
- → ↑ inhibicija frenukusa i inhibicija spinalnog refleksa → usporen motilitet GIT

Multi Modalna Terpija Bola

- Potencijal delovanja istovremeno
  - Simultana kombinacija različitih lekova
  - Efekta na različite receptore
  - Na različitim nivoima
  - Različite puteve / tehnike administracije lekova

Multi Modalna Terpija Bola

- Različiti analgetici
- Različiti mehanizmi delovanja na PNS /CNS
- Lokalna /regionalna
- Lokalni anestetici / opioidi
- U kombinaciji sa sistemskim analgeticima / opioidima
- Različite tehnike
- Adjuvantne opcije

- Individualnom / ukupnom kliničkom stanju
- Vrsti operativnog zahvata
- Ukupnoj strategiji :
  - Perioperativnog lečenja
  - Anestezije
  - Post Op
    - Lečenja
    - Analgezije

Modaliteti MMTB

- Fizički
  - TENS (Transkutana Električna Stimulacija Nerva)
    - Redukcija centralne ekscitabilnosti – aktivacija endogene descdentne inhibicije – opioidni receptori
  - Akupunktura
  - Krioterapija
  - Lokalizovano grejanje
  - Imobilizacija

The Journal of Pain, Vol 17, No 2 (February), 2016: pp 131-157
Available online at www.jpain.org and www.sciencedirect.com

Modaliteti MMTB

- Kognitivni modaliteti
  - Imaginacija
  - Relaksacija
  - Hipnoza
  - Multikomponentne metode relaksacije
  - Sugestije (tokom anestezije)

Modaliteti MMTB

- Farmakološka
  - Per os opijati vs iv. administracije
  - Izbegavati im. aplikaciju
  - Iv PCA – kad god je moguće
  - Acetaminofen i NSAIDs (COX2) kad god je moguće
  - Gabapentin (600 /1200 mg) / Pregabalin (150 / 300 mg) pre Op (30 – 120 min)
  - Ketamin (pre Op bolus 0,5mg/kg + iv infuzija 10 µg/kg/min)
  - Lidocain (pre Op bolus 1-2 mg/kg + iv infuzija 2-3 mg/kg/h)

Incizioni/intraaartikularni lokalni anestetici

Incizioni/intraartikularni lokalni anestetici	
Prednosti	▪ inc. LA – smanjuju potrebe za opioidima; smanjuju bol u miru i pri mobilizaciji (mala hirurgija) ▪ efekat traje 4 – 8 h ▪ sličan, ali manje jasan efekat pri velikoj hirurgiji
Neželjeni efekti	▪ nisu uočeni u kontrolnim studijama
Preporuke	▪ mala hirurgija (? – velika hirurgija) ▪ Bupivacaine: 2,5 mg/ml, 40-60 ml ▪ monitoring: ako se infiltriše preop.- ne; postop.- BP u toku 1 h ▪ Ia-LA: preporučuju se za ranu, ali ne samostalnu postop. analg.
Cena	▪ niska

Modaliteti MMTB

- Periferna regionalna anestezija***
  - Periferna regionalna anestzija – određena poljem hirurgije (ekstremiteti, rame, torakotomija, Carski rez, cirkumcizija....)
  - Kontinuirana

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Nesteroidni antiinflamatorni lekovi (NSAID)

NSAID (COX1; COX2 inhibitori)	
Prednosti	▪ koriste se kao mono terapija u maloj/ srednje velikoj hirurgiji ▪ korisni u kombinaciji sa opioidima u velikoj hirurgiji ▪ smanjenjem potrebe u opioidima smanjuju incidencu postop. muke, povraćanja, resp. depr./hipoksemije, poboljšavaju kvalitet sna i ubrzavaju crevnu peristaltiku ▪ ubrzavaju oporavak i skraćuju hospitalizaciju
Neželjeni efekti	▪ moguće povećano postop. krvarenje (retko i malo) ▪ kratka th ne daje GI tegobe ▪ veoma retko: ARI
Preporuke	▪ dobri za male i srednje procedure ▪ poznavati specifične kontraindikacije ▪ nije indikovano preop. davanje (intraop.?) ▪ izbeći kod RI ili kod potencijalne ARI
Cena	▪ umerena

Anesth Pain Med. 2015 Oct 10;5(5):e29688. doi: 10.5812/aapm.29688. eCollection 2015.

BACKGROUND:

Major surgical procedures, such as gastrectomy, result in extensive postoperative pain, ...

OBJECTIVES:

The aim - to evaluate the effect **of adding diclofenac suppositories or intravenous paracetamol, on morphine consumption** and on the quality of post gastrectomy pain control.

PATIENTS AND METHODS:

PRDB Study **90 patients with gastric cancer**, ... **(PCA) with morphine, morphine PCA plus intravenous paracetamol 1 g, every 6 hours, and morphine PCA plus diclofenac suppositories, 100 mg every 8 hours.** The patients were evaluated for up to 24 hours after the operation for the severity of pain, alertness, and opioid complications.

RESULTS:

There was no significant difference in pain scores among the three groups (P values, after extubation, at 2, 4, 6, 12, 18 and 24 hours were 0.72, 0.19, 0.21, 0.66, 0.54, 0.56, and 0.25, respectively), although morphine consumption was greater in the morphine group, compared with the other two groups (21.4 ± 7.7 mg in morphine group vs. 14.3 ± 5.8 mg in morphine-paracetamol group and 14.3 ± 3.9 in morphine-diclofenac group; P = 0.001). In morphine group, during the first 24 hours, the patients had lower levels of consciousness (P values, after extubation, at 2, 4, 6, 12, 18 and 24 hour were 0.6, 0.95, 0.28, 0.005, 0.027, 0.022 and 0.004 respectively), even though the incidence of complications was similar among the three groups.

CONCLUSIONS:

In this study, intravenous paracetamol or diclofenac suppositories, administered for postgastrectomy pain control, decreased morphine consumption by almost 32% and also improved alertness. **Nevertheless, the amount of opioids did not affect the incidence of complications**

Ketamin

- Intravenski anestetik
  - NMDA antagonist
  - Uvod u anesteziju
    - 1 – 1,5 mg/kg iv spori bolus, kod dece 3-5 mg/kg im
  - Održavanje anestezije
    - 1/3 doze za uvod u A
  - Kratotrajne ambulantne dijagnostičko / terapijske procedura
  - K + infuziona PCA
  - K – epiduralno i intratekalno

Modaliteti MMTB

- Neuroaksijalna ***
  - Epiduralna (LA i ili opioidi)(klonidin)
    - Kontinuirana infuzija
    - PCA
  - Spinalna (opioidi)
  - Op : torakalne, abdominalne, kuka, ekstremiteta ...

The Journal of Pain, Vol 17, No 2 (February), 2016: pp 131-157
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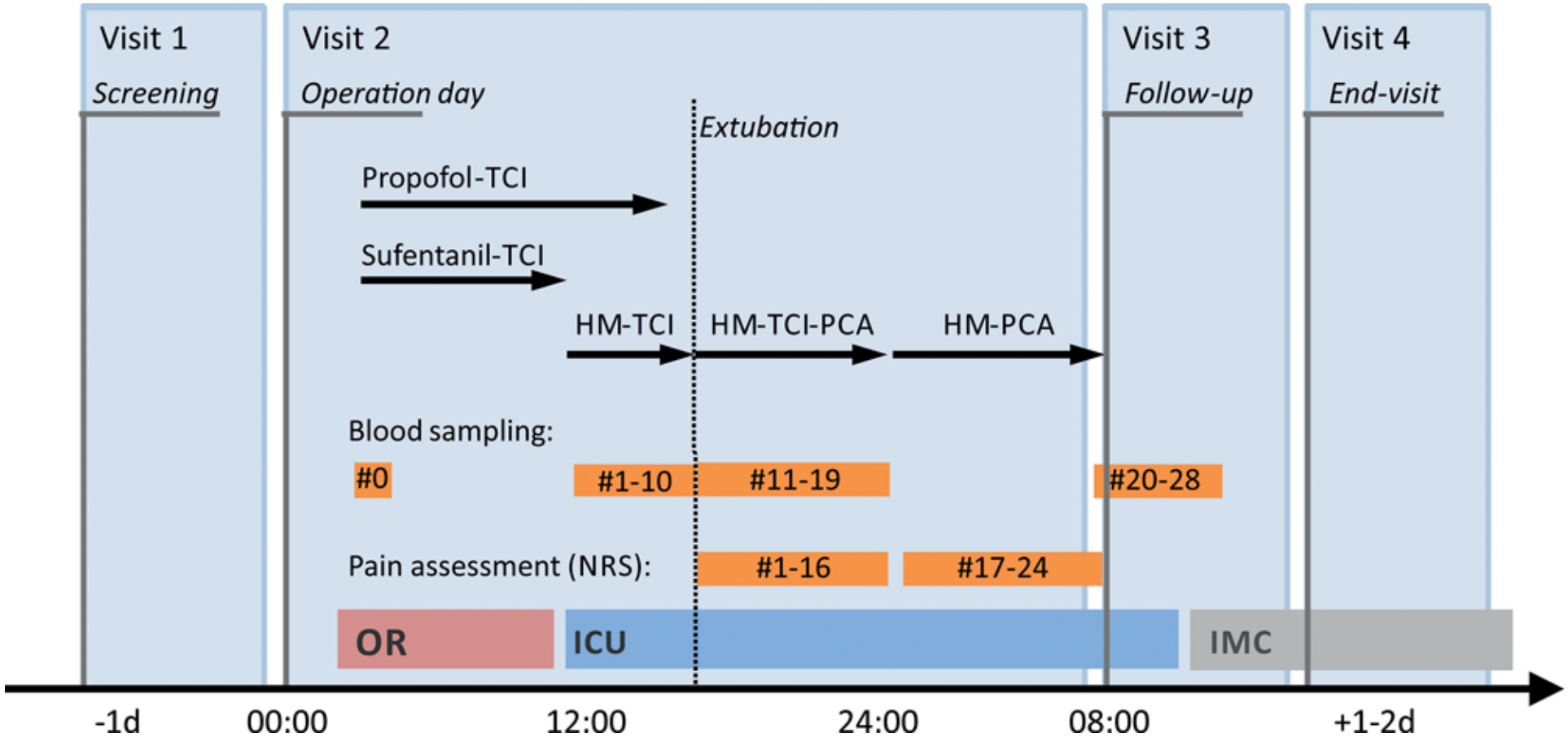
Opioidi

- Subkutano, transkutano, transmukozno, intramuskularno
- Post Op najčešće – oralno i iv
- Epiduralno,
  - Bolus ; infuzija, PCEA (i LA)

- IV (i/ili u kombinaciji sa NSAID
  - Intermitentno
  - Infuzija
  - Infuziona PCA

Intravenska PCA

Koncentracija leka	Bolus doza	Lockout interval (min)	Kontinuirana infuzija
Morfin (1mg/ml) Odrasli Deca	 0,5 – 2,5 mg 0,01 – 0,03 mg/kg	 5 – 10 5 -10	 0,01 – 0,03 mg/kg/h
Fentanil (10µg/ml) Odrasli Deca	 10 – 20 µg 0,5 – 1 µg/kg	 4 – 10 5 - 10	 0,5 – 1 µg/kg/h
Sufentanil (0,002 mg/ml)	2 – 5 µg	4 – 10	
Pentazocin (10mg/ml)	5 – 30 mg	5 - 15	
Alfentanil (01mg/ml)	0,1 – 0,2	5 - 8	
Metadon (1mg/ml)	0,5 – 2,5 mg	8 - 20	
Meperidin (10mg/ml)	5 – 25 mg		



- 50 adult patients undergoing cardiac surgery
- Post Op pain treatmnet – hydromorphon (0,1 – 0,2 mg/h)
- TCI – 2 → 1 ηg/ml (0,8 -10)
- Pain assessment – NRS
- Additional Th – acetaminophen 1,0 /12h

Anesthesiology 2016; 124:56-68

Farmakodinamske osobine i efekti opioida apliciranih neuroaksijalno

Farmakodinamske osobine i efekti opioida apliciranih neuroaksijalno

Osobina	Lipofilni opioidi	Hidrofilni opioidi
Često upotrebljavani lekovi	Fentayl, Sufentanyl	Morfin, Hydromorfion
Početak analgezije	Brzi početak (5-10min)	Odloženi početak (30-60 min)
Trajanje analgezije	Kraće trajanje (2-4h)	Duže trajanje (6-24h)
Širenje kroz cerebro spinalnu tečnost	Minimalno širenje	Ekstenzivno širenje
Mesto delovanja	Spinal ± sistemsko	Primarno spinalno
Neželjena dejstva		
Mučnina i povraćanje	**Niža incidence kod lipofilnih nego kod hidrofilnig opioida**	
Svrab	***Niža incidence kod lipofilnih nego kod hidrofilnig opioida***	
Respiratorna depresija	**Primarno rana, minimalno odložena**	**Moguće su rana (< 6h) i odložena (>6h)**

Preporučeni nivo plasiranja epiduralnog katetera za određene procedure

Preporučeni nivo plasiranja epiduralnog katetera za određene procedure	
Primer hirurške procedure	Kongruentno plasiranje epiduralnog katetera
Resekcija pluća, Radikalna mastektomija, Torakotomija, Timektomija	Th 4-8
Resekcija jetre, Wipple procedura, Holecstektomija, Ezofagektomija, Gastrektomija,	Th 6-8
Nefrektomija, Cisteoprostaktomija	Th 7-10
Radikalna prostatektomija, Totalna abdominalna histerektomija, Rekonstrukcija AAA, Kolektomija	Th 8-11
Femoro-poplitealni bajpas, Totalna zamena kuka ili kolena	L 1-4

Kontinuirana epiduralna analgezija kontrolisana od strane pacijenta PCEA

Rastvor analgetika	Brzina kontinurane infuzije (ml/h)	Inicijalna -bolus doza	Interval zaključavanja (min)
Generalni režimi			
0.05% Bupivakain + 4 µg/ml Fentanila	4	2	10
0.0625% Bupivakain + 5 µg/ml Fentanila	4-6	3-4	10-15
0.1% Bupivakain + 5 µg/ml Fentanila	6	2	10-15
0.1% Ropivakain + 5 µg/ml Fentanila	5	2	20
Torakalna hirurgija			
0.0625% Bupivakain + 5 µg/ml Fentanila	3-4	2-3	10-15
Abdominalna hirurgija			
0.0625% Bupivakain + 5 µg/ml Fentanila	4-6	3-4	10-15
0.125% Bupivakain + 0.5 µg/ml Sufentanila	3-5	2-3	12
0.1% - 0.2% Ropivakain + 2 µg/ml Fentanila	3-5	2-5	10-20
Hirurgija donjih ekstemiteta			
0.0625% - 0.125% Bupivakain + 5 µg/ml Fentanila	4-6	3-4	10-15
0.125% Levobupivakain + 4 µg/ml Fentanila	4	2	10

- PRS in elderly patients (50) undergoing major abdominal surgery to compare the effectiveness on pain and safety
- general anesthesia was induced with 3–5 mg/kg thiopental and 0.2–0.4 µg/kg sufentanil.

- The main finding - PCA techniques using either intravenous or epidural routes provide effective management of postoperative pain. However, the epidural route with a combination of local anesthetics and a liposoluble opioid resulted in **better postoperative pain relief** at **rest and during cough without increasing complications compared with the intravenous route.**
- **Improved mental status and a quicker gastrointestinal recovery also were observed with PCEA.**

Alfa 2 adrenergički agonisti/KLONIDIN	
Prednosti	• Smanjuju dozu drugih analgetika iredukuju neželjene efekte • Sa opioidima daju bolju analgeziju • Produženo trajanje bloka lokalnim anestetikom
Neželjeni efekti	• Hipotenzija, Bradikardija, Sedacija/Muka, Gađenje, Povraćanje
Preporuke	• Nisu za monomodalnu primenu • **Glavna uloga - kao dodatak drugim lekovima**
Cena	• Niska

Post Op -Terapija bola

- Pre Op procena, premedikacija
- Uvod u anesteziju, izbor anestetika i anestezijske tehnika
  - Opšta
    - inhalaciona
    - Intravenska - TIVA – TCA
    - + lokalna, blok
  - Regionalna (LA, opioidi, LA + op) + opšta
    - kontinuirana
    - intermitentna
- Post Op analgezija

Post Op -Terapija bola

- Lokalna – blok (interkostalni, intrapleuralni ...)
- Im , Iv (intermitentna, kontinuirana)
- PCA
- Epiduralna
  - *Intermitentna, kontinuirana*
  - *PCEA*
- Lekovi i kombinacije
  - *LA*
  - *Opioidi*
  - *NSAID*
  - *Clonidin, ketalar .....*

Klinička praksa

- Anesth Analg. 2010 Apr 1;110(4):1170-9.

Combining paracetamol (acetaminophen) with nonsteroidal antiinflammatory drugs: a qualitative systematic review of analgesic efficacy for acute postoperative pain.

CONCLUSION:

Current evidence suggests that a combination of paracetamol and an NSAID may offer superior analgesia compared with either drug alone.

- Anaesth Intensive Care. 2014 Jan;42(1):43-50
  Parecoxib and paracetamol for pain relief following minor day-stay gynaecological surgery.
  - A randomised, blinded, placebo-controlled, single-centre trial was conducted among 240 women undergoing dilatation and curettage four groups,
  - to receive either intravenous paracetamol 2 g, intravenous parecoxib 40 mg, both in combination, or placebos, post-induction and with intravenous fentanyl
  - Women having uterine curettage and receiving intravenous fentanyl do not appear to benefit from administration of these non-opioid analgesics.

Klinička praksa

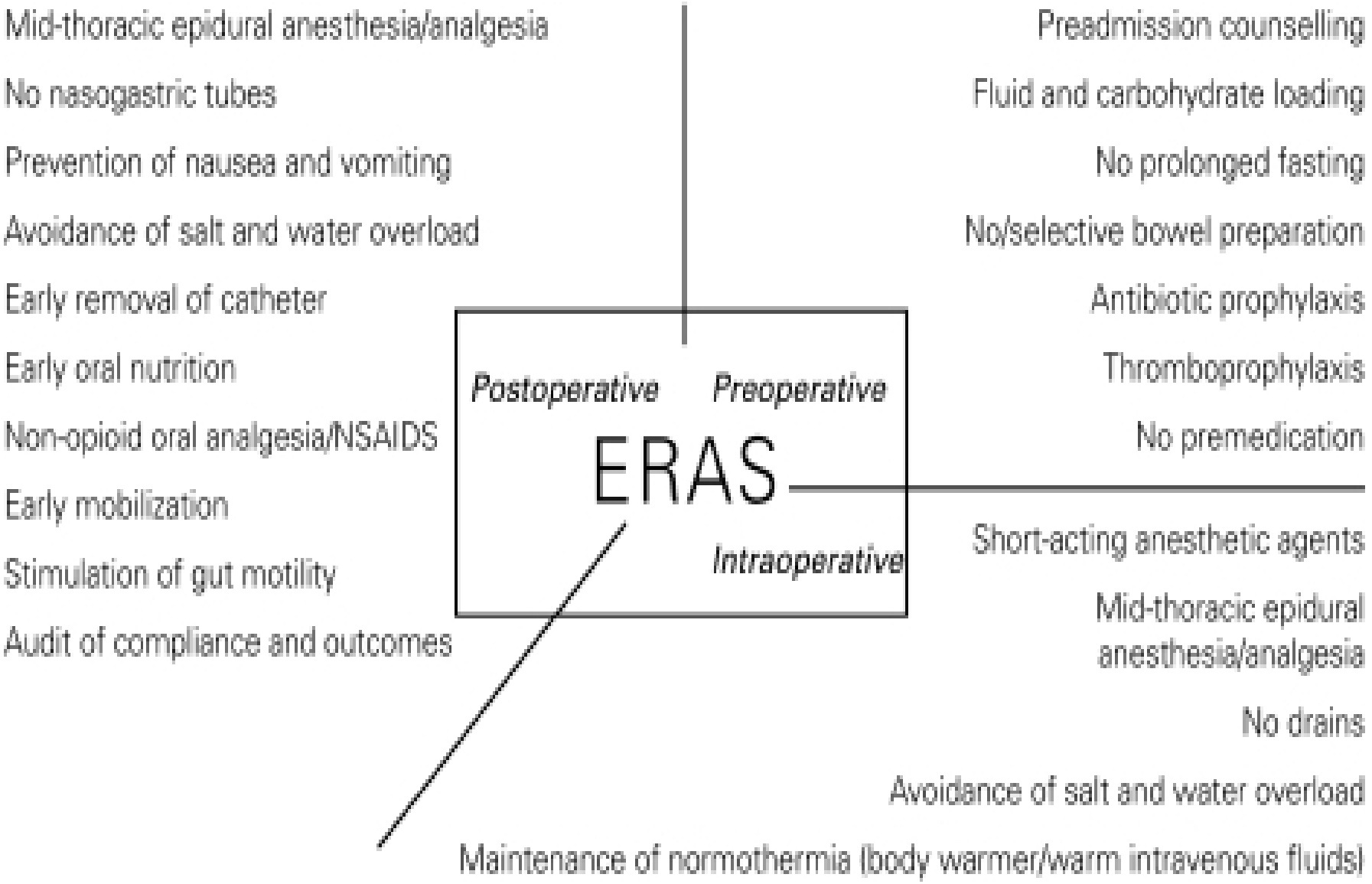
- Agri. 2010 Jan;22(1):7-12.
- **[The effects of intravenous paracetamol on postoperative analgesia and tramadol consumption in cesarean operations].**
- **OBJECTIVES:**
  - effects and side effects of intravenous paracetamol application, combined with patient-controlled intravenous tramadol analgesia,
  - Fifty ASA I-II patients scheduled for
  - divided into two groups: **group I** served as a control group, with **saline** administration (100 ml) 15 min before the end surgery and every 6 h for 24 h, - **group II** received **paracetamol (1 g/100 ml**) at the stated time points. All patients received a standard anesthetic protocol.
  - **At the end of surgery, all patients received tramadol i.v. via a PCA (patient-controlled analgesia) device.** Pain and sedation scores were assessed at 1, 3, 6, 12 and 24 h postoperatively.
- **CONCLUSION:**
  - We conclude that paracetamol is a safe and effective treatment option in post-cesarean pain for combination with tramadol, as it produces effective analgesia and reduces tramadol consumption.

•Enhanced recovery after surgery (ERAS) protocols are multimodal perioperative care pathways designed to achieve early recovery after surgical procedures by maintaining pre-operative organ function and reducing the profound stress response following surgery.

•The key elements of ERAS protocols include preoperative counselling, optimization of nutrition, standardized analgesic and anesthetic regimens and early mobilization.[4–8]

•Despite the significant body of evidence indicating that ERAS protocols lead to improved outcomes,[9,10] they challenge traditional surgical doctrine, and as a result their implementation has been slow.

•Although much of the data arise from colorectal surgery, the evidence is applicable to major urological surgery, in particular radical cystectomy.



Can Urol Assoc J. 2011 Oct; 5(5): 342–348.

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Available online at www.jpain.org and www.sciencedirect.com

Table 3. Options for Components of Multimodal Therapy for Commonly Performed Surgeries

Type of Surgery	Systemic Pharmacologic Therapy	Local, Intra-articular or Topical Techniques*	Regional Anesthetic Techniques*	Neuraxial Anesthetic Techniques*	Nonpharmacologic Therapies†
Thoracotomy	Opioids‡ NSAIDs§ and/or acetaminophen Gabapentin or pregabalin§ i.v. ketamine¶		Paravertebral block	Epidural with local anesthetic (with or without opioid), or intrathecal opioid	Cognitive modalities TENS
Open laparotomy	Opioids‡ NSAIDs§ and/or acetaminophen Gabapentin or pregabalin§ i.v. ketamine¶ i.v. lidocaine	Local anesthetic at incision i.v. lidocaine infusion	Transversus abdominis plane block	Epidural with local anesthetic (with or without opioid), or intrathecal opioid	Cognitive modalities TENS
Total hip replacement	Opioids‡ NSAIDs§ and/or acetaminophen Gabapentin or pregabalin§ i.v. ketamine¶	Intra-articular local anesthetic and/or opioid	Site-specific regional anesthetic technique with local anesthetic	Epidural with local anesthetic (with or without opioid), or intrathecal opioid	Cognitive modalities TENS
Total knee replacement	Opioids‡ NSAIDs§ and/or acetaminophen Gabapentin or pregabalin§ i.v. ketamine¶	Intra-articular local anesthetic and/or opioid	Site-specific regional anesthetic technique with local anesthetic	Epidural with local anesthetic (with or without opioid), or intrathecal opioid	Cognitive modalities TENS
Spinal fusion	Opioids‡ Acetaminophen† Gabapentin or pregabalin§ i.v. ketamine¶	Local anesthetic at incision		Epidural with local anesthetic (with or without opioid), or intrathecal opioid	Cognitive modalities TENS
Cesarean section	Opioids‡ NSAIDs§ and/or acetaminophen	Local anesthetic at incision	Transversus abdominal plane block	Epidural with local anesthetic (with or without opioid), or intrathecal opioid	Cognitive modalities TENS
CABG	Opioids‡ Acetaminophen Gabapentin or pregabalin§ i.v. ketamine¶				Cognitive modalities TENS

MMTB

- Deo ukupnog post Op lečenja
- Preduslovi
  - Hemodinamska stabilnost
    - Optimalna perfuzija / oksigenacija
  - Normotermija
    - Telesna T i temperatura rastvora
  - Održavnje (homeostaze – AB i El stabilnost...)
  - Gasna razmena – invazivna /neinvazivna MV

Organizacija – Servis terapije bola –
Deo Odeljenja anesteziologije

- Terapija akutnog bola
  - Anesteziolozi, farmakolozi ....
  - Med sestre /tehničari
- Terapija hroničnog bola
- Glavobolje
- Akupunktura
- Psihosocijalna podrška
  - psiholozi
- Edukacija
  - Pacijenata
  - Lekara i sestara na odeljenju

Strengthening Capacities for Higher Education of Pain Medicine in Western Balkan countries – HEPMP

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HIGHER EDUCATION PAIN MEDICINE PROJECT