

Preventing persistent postsurgical pain: what can we do?

Irina Evansa, MD, PhD

Head of Anaesthesiology, Intensive Care and Pain Department
Riga 1st Hospital



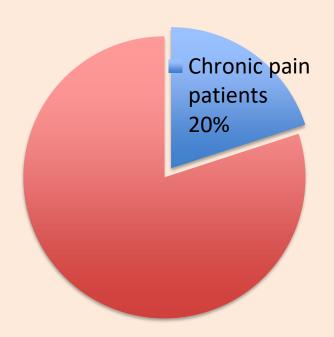
Definition



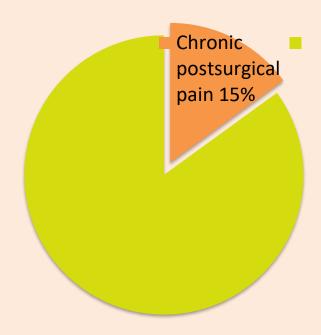
- Chronic postsurgical pain is pain developing or increasing in intensity after a surgical procedure
- at least 3 months after surgery
- Pain is localized in the surgical field or in referred area
- A continuation of acute post-surgery pain or develops after an asymptomatic period
- Exclusion of other possible causes for the pain (infection, cancer recurrence ...)

Chronic Post-Sugical Pain (CPSP) prevalence

World population



Chronic pain patient population



Incidence of persistent postsurgical pain acording surgical procedure

Surgery	Moderate to Severe Pain beyond 3 Months
Amputation ⁹⁴	30 to 81%
Cesarean section178	15.4%
Cholecystectomy ¹⁷	3 to 56%
Hernia repair ⁸	5 to 35%
Hysterectomy ¹⁷⁹	5 to 32%
Mastectomy ⁸	20 to 50%
Hip replacement ¹⁸⁰	7 to 23%
Thoracotomy ¹⁷	61 to 70%

Classification post-operative pain

NOCICEPTIVE

 Activation of high threshold peripheral sensory neurons

Peripheral sensitisation

INFLAMMATORY

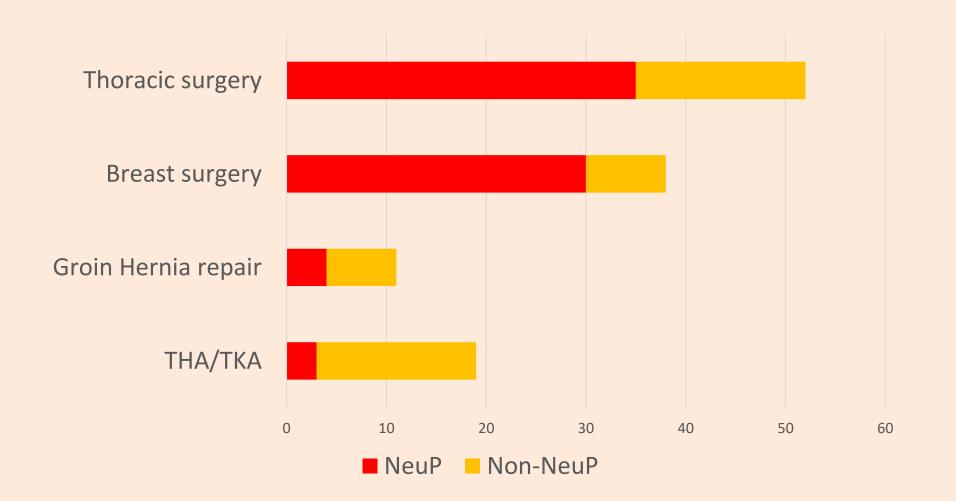
- Activation of local or infiltrating immune or stromal cells, release of inflammatory mediators in response to nonneuronal injury
- Peripheral and central sensitisation

NEUROPATHIC

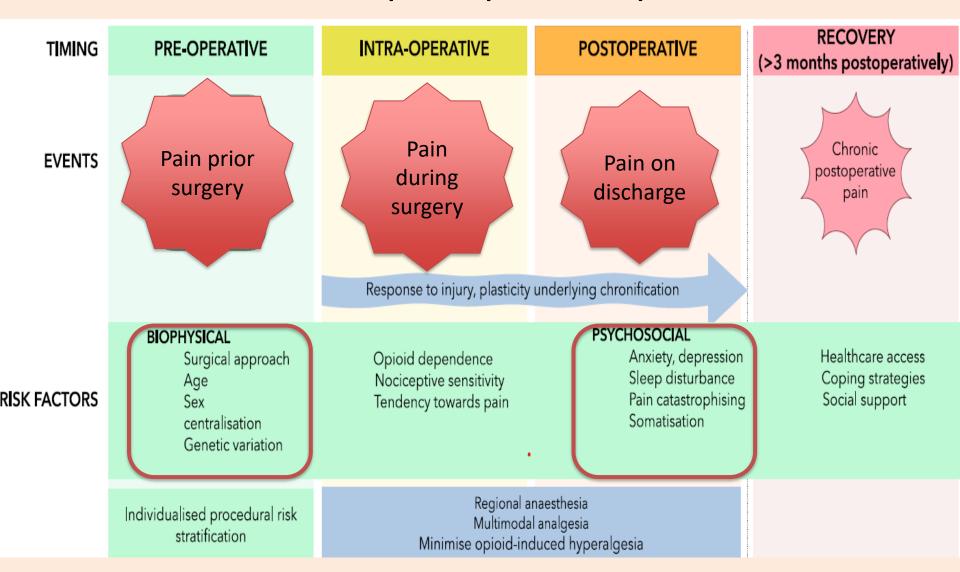
Injury to neuronal structures

Peripheral and central sensitisation

The neuropathic component in persistent postsurgical pain



Risk factors contributing to the development of chronic postoperative pain



Surgical factors



SIZE, SITE AND NUMBER
OF INCISIONS
(INTRAOPERATIVE
NERVE DAMAGE, TISSUE
ISCHEMIA)



INCREASED DURATION (>3H)



OPEN SURGERY



REPEAT SURGERY

Prevention

Multimodal pain regimens might include combinations of gabapeptinoids, ketamine, IV lidocaine, NSAIDs, acetaminophen, and regional anesthesia with the conventional analgesia technique

PAIN MEDICINE

ANESTHESIOLOGY

Pharmacotherapy for the Prevention of Chronic Pain after Surgery in Adults: An Updated Systematic Review and Meta-analysis

Meg E. Carley, B.Sc., Luis E. Chaparro, M.D., F.R.C.P.C., Manon Choinière, Ph.D., Henrik Kehlet, M.D., Ph.D., R. Andrew Moore, D.Sc., Elizabeth Van Den Kerkhof, R.N., Dr.PH., lan Gilron, M.D., M.Sc.

ANESTHESIOLOGY 2021; 135:304-25

- 6693 records were screened
- Characteristics of the 110 included studies (70 new plus 40 from the previous review 2013)
- double-blind, placebo-controlled, randomized
- pts 18 yr and older
- planned surgical procedure
- drugs administered ≤ 24 h or > 24 h
- before, during, or after the procedure
- measure of pain 3, 6 and 12 mo postsurgery.

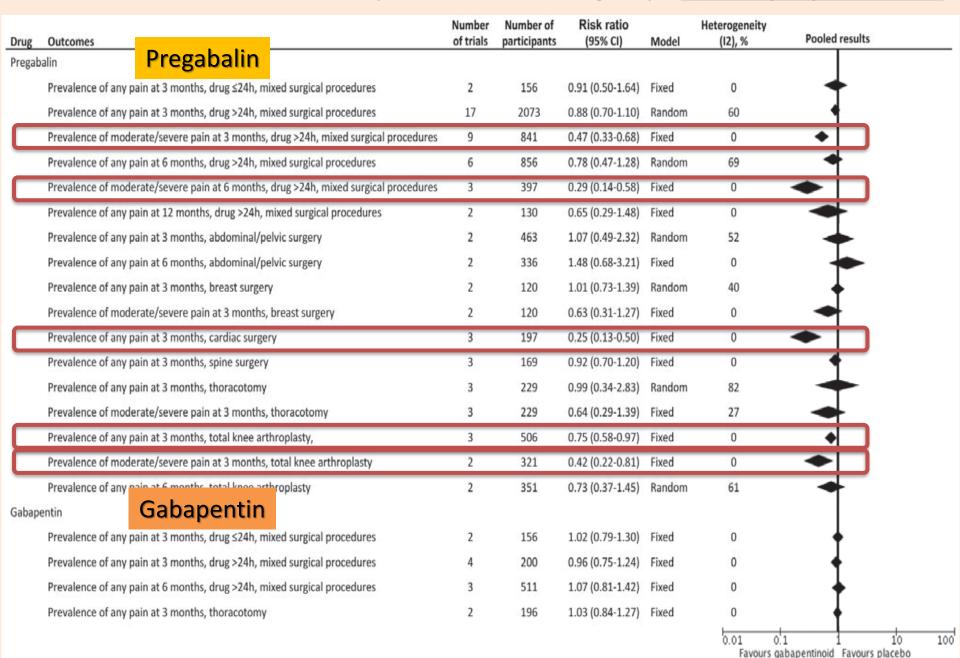
Prevention of chronic pain after surgery: Ketamine

Outcomes	Number of trials	Number of participants	Risk ratio (95% CI)	Model	Heterogeneity (I2), %	Pooled results
Prevalence of any pain at 3 months, drug ≤24h, mixed surgical procedures	4	298	0.94 (0.70-1.28)	Fixed	0	+
Prevalence of any pain at 3 months, drug >24h, mixed surgical procedures	5	331	0.83 (0.58-1.18)	Fixed	24	•
Prevalence of moderate/severe pain at 3 months, drug >24h, mixed surgical procedures	2	128	0.51 (0.16-1.58)	Fixed	0	•
Prevalence of any pain at 6 months, drug ≤24h, mixed surgical procedures	6	553	0.62 (0.36-1.07)	Random	57	•
Prevalence of any pain at 6 months, drug >24h, mixed surgical procedures	10	591	0.91 (0.74-1.12)	Fixed	0	4
Prevalence of moderate/severe pain at 6 months, drug >24h, mixed surgical procedures	5	284	0.68 (0.40-1.17)	Fixed	0	•
Prevalence of any pain at 12 months, drug ≤24h, mixed surgical procedures	3	244	0.48 (0.16-1.49)	Fixed	0	•
Prevalence of any pain at 12 months, drug >24h, mixed surgical procedures	2	103	0.82 (0.42-1.61)	Fixed	0	•
Prevalence of moderate/severe pain at 12 months, drug >24h, mixed surgical procedures	2	103	0.40 (0.12-1.27)	Fixed	0	•
Prevalence of any pain at 6 months, abdominal/pelvic surgery	2	164	0.37 (0.12-1.11)	Random	31	
Prevalence of any pain at 3 months, thoracotomy	4	240	0.84 (0.52-1.38)	Random	42	•
Prevalence of moderate/severe pain at 3 months, thoracotomy	2	128	0.51 (0.16-1.58)	Fixed	0	-
Prevalence of any pain at 6 months, thoracotomy	5	310	0.90 (0.56-1.44)	Random	43	+
Prevalence of moderate/severe pain at 6 months, thoracotomy	2	120	1.01 (0.18-5.69)	Fixed	0	
Prevalence of any pain at 6 months, total knee arthroplasty	2	59	0.84 (0.60-1.17)	Fixed	0	•
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Anesthesiology 2021; 135:304-25

Favours ketamine Favours placebo

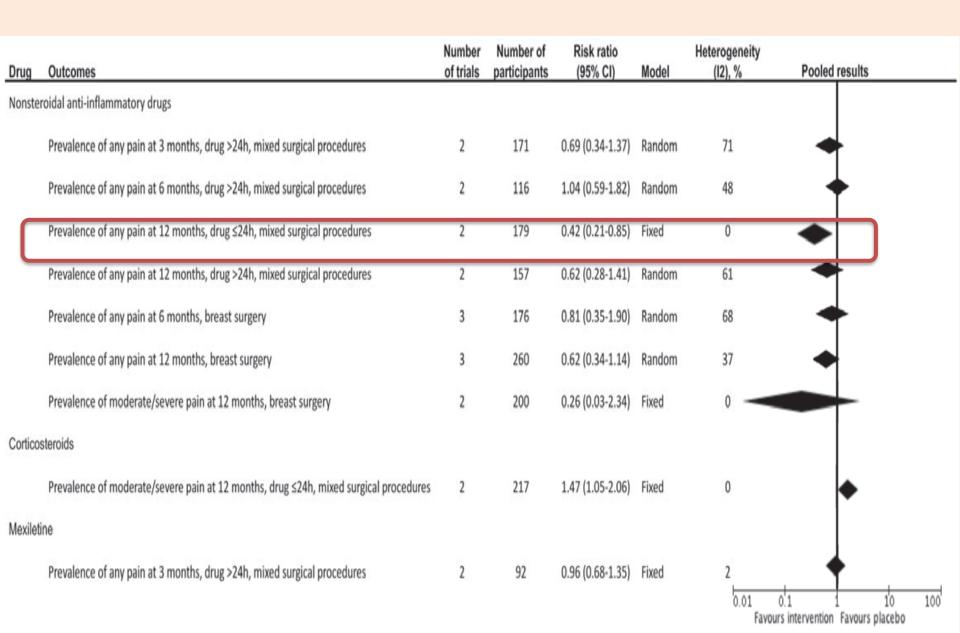
Prevention of chronic pain after surgery: Gabapeptinoids



Prevention of chronic pain after surgery: IV <u>Lidocaine</u>

	Number	Number of	Risk ratio		Hataraganaitu	
Outcomes	Number of trials	Number of participants	(95% CI)	Model	Heterogeneity (I2), %	Pooled results
Prevalence of any pain at 3 months, drug ≤24h, mixed surgical procedures	5	331	0.68 (0.36-1.30)	Random	81	•
Prevalence of moderate/severe pain at 3 months, drug ≤24h, mixed surgical procedures	2	133	0.41 (0.13-1.27)	Fixed	0	•
Prevalence of any pain at 6 months, drug ≤24h, mixed surgical procedures	2	182	0.43 (0.23-0.80)	Fixed	0	•
Prevalence of moderate/severe pain at 6 months, drug ≤24h, mixed surgical procedures	2	182	0.53 (0.18-1.51)	Fixed	0	•
Prevalence of any pain at 3 months, breast surgery	4	247	0.80 (0.43-1.50)	Random	75	•
Prevalence of moderate/severe pain at 3 months, breast surgery	2	133	0.41 (0.13-1.27)	Fixed	0	•
Prevalence of any pain at 6 months, breast surgery	2	182	0.43 (0.23-0.80)	Fixed	0	•
Prevalence of moderate/severe pain at 6 months, breast surgery	2	182	0.53 (0.18-1.51)	Fixed	0	•
					0.01 0.1 Favours I	1 10 idocaine Favours placebo

Prevention of chronic pain after surgery: Other drugs



postoperative pain								
Type of surgery	Studies (n)	Studies that favoured RA or LA, significantly different	Studies that favoured RA or LA, not significantly different	Studies that showed no difference or favoured conventional therapy	RA or LA techniques shown to favour prevention of chronic postoperative pain			
Breastsurgery	15	 Kendall 2017 Strazisar 2014 Grigoras 2012 Strazisar 2012 Kairaluoma 2006 Fassoulaki 2000 	 Karmakar 2014 Lee 2013 Ibarra 2011 Terkawi 2015 Fassoulaki 2005 	 Al Ja'bari 2019 Albi-Feldzer 2013 Baudry 2008 Fassoulaki 2001 	 Intravenous lidocaine infusion Continuous wound infusion Lidocaine cream Paravertebral block 			
Thoracotomy	8	Borys 2020Lu 2008	Comez 2015Can 2013Ju 2008Senturk 2002	Liu 2015Katz 1996	EpiduralParavertebral block			
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surgery	(n)	different	significantly different	therapy	chronic postoperative pain
Breastsurgery	15	 Kendall 2017 Strazisar 2014 Grigoras 2012 Strazisar 2012 Kairaluoma 2006 Fassoulaki 2000 	 Karmakar 2014 Lee 2013 Ibarra 2011 Terkawi 2015 Fassoulaki 2005 	 Al Ja'bari 2019 Albi-Feldzer 2013 Baudry 2008 Fassoulaki 2001 	 Intravenous lidocaine infusion Continuous wound infusion Lidocaine cream Paravertebral block
Thoracotomy	8	Borys 2020Lu 2008	Comez 2015Can 2013Ju 2008Senturk 2002	Liu 2015Katz 1996	EpiduralParavertebral block
Caesarean section	5	• Shahin 2010	McKeen 2014Bollag 2012Lavand'homme 2007	• Loane 2012	Intraperitoneal installationTAP blockContinuous wound infusion
Iliac bone graft	4	Singh 2007Blumenthal 2005Gundes 2000	Barkhuysen 2010		Continuous wound infusionMultiple wound infiltrationsLocal wound infiltration
Amputation	1		 Karanikolas 2006 		 Epidural

Vrooman 2015

Katz 2004

Lavand'homme

Mounir 2010

2005

Cardiac surgery

2

Laparotomy

repair

Inguinal hernia

Dogan 2016

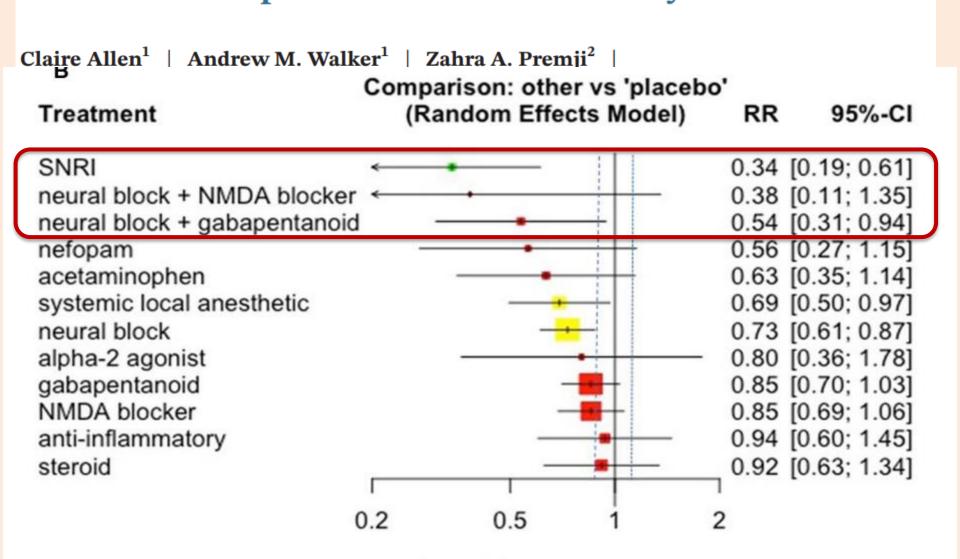
Kurmann 2015 Theodoraki 2019 Lidocaine patch

Local wound infiltration

Epidural

Preventing persistent postsurgical pain: A systematic review and component network meta-analysis





Favors Treatment Favors Placebo Relative Risk of Persistent Pain

Eur J Pain. 2022;26:771–785.

Conclusions

- Chronification of pain is bio-psycho-social process (risk fa)
- Nerve damage, tissue ischemia during surgery??
- Active managements of pre-, intra- and post operative pain
- There is currently limited evidence for drugs preventing chronic postsugical pain:
 - ✓ combinations of drugs?
 - ✓ regional anaesthesia prevent some chronic postsugical pain?
 - ✓ combination of regional anaesthesia with drugs?



To treat or not to treat?