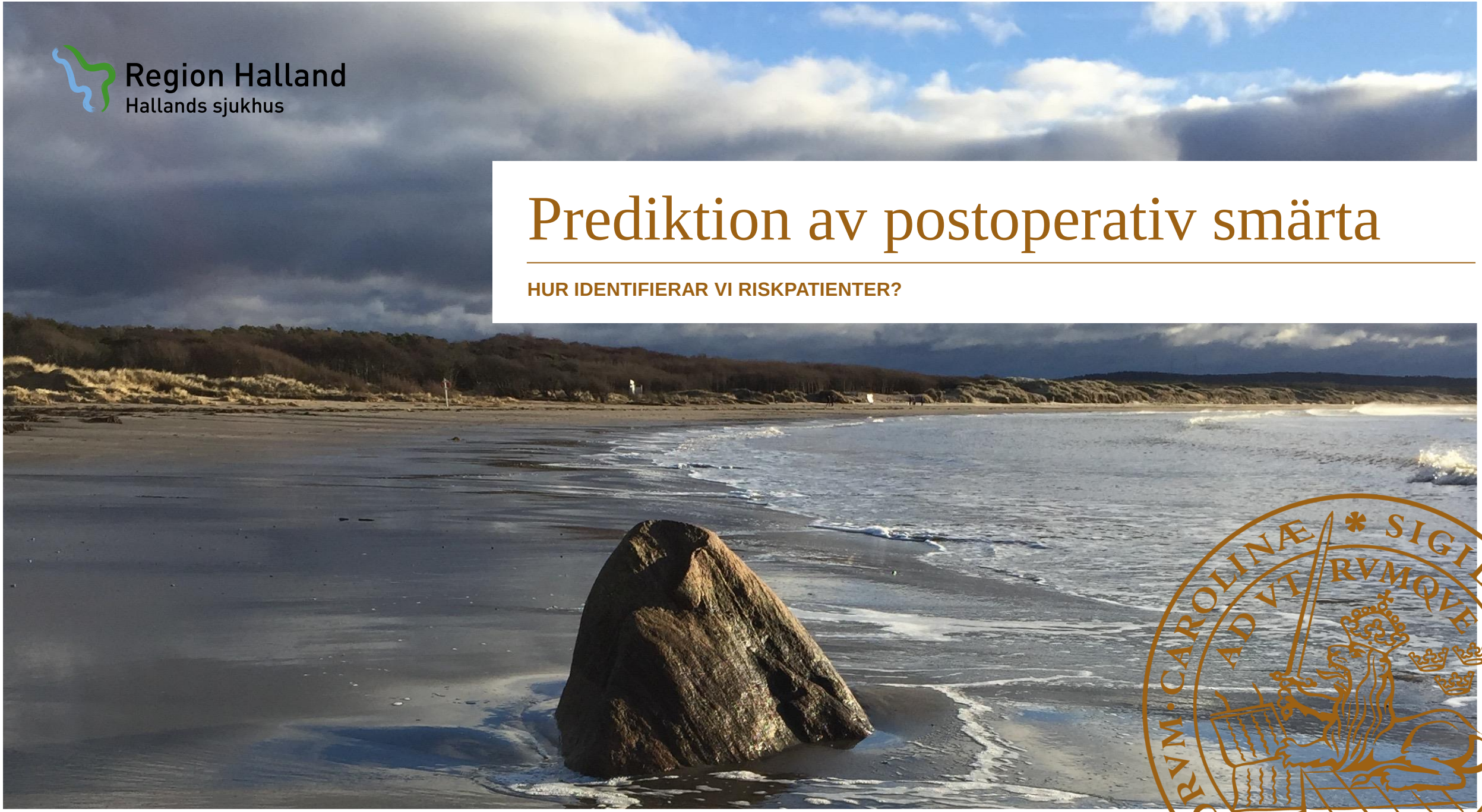
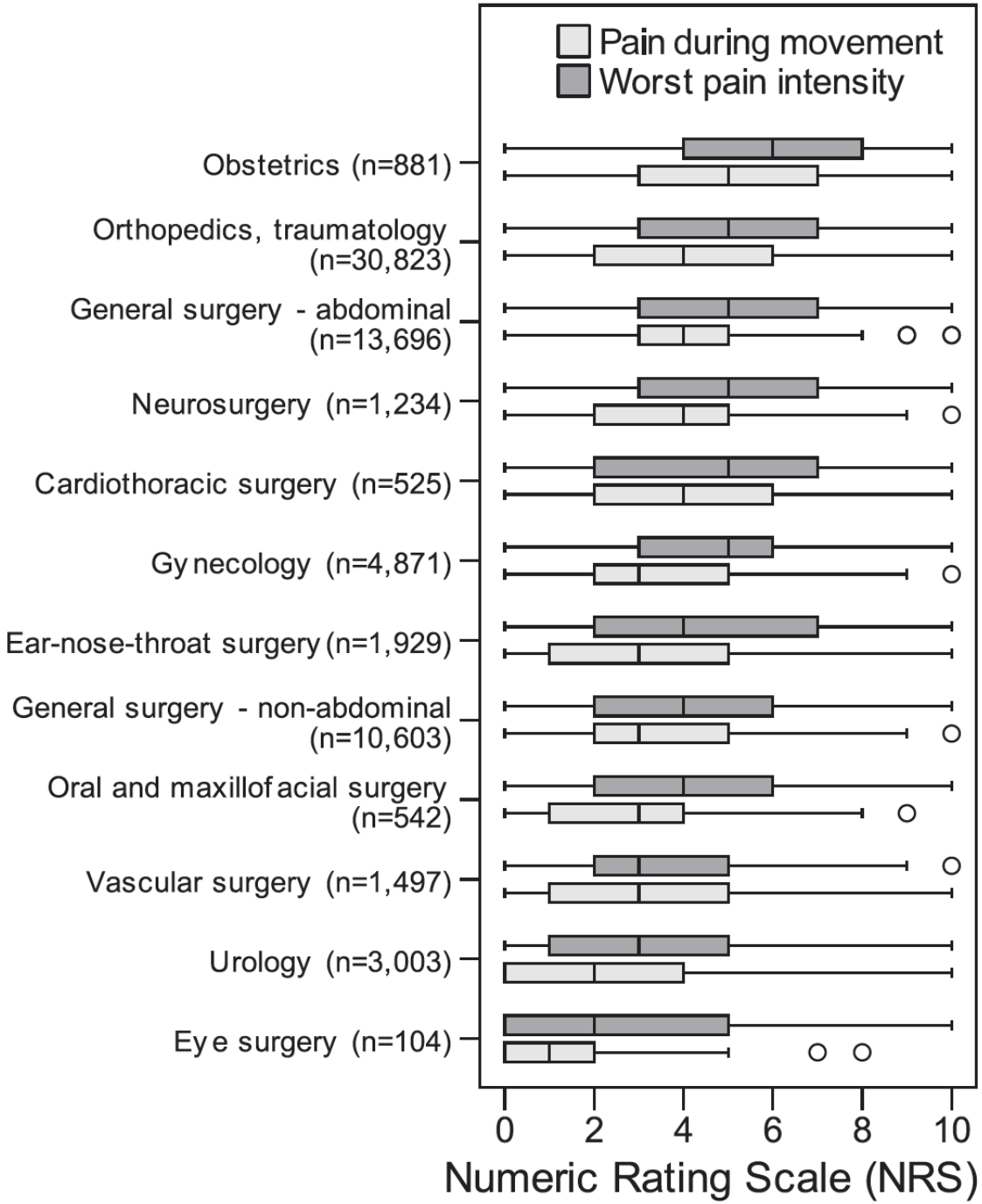
Region Halland
Hallands sjukhus

Prediktion av postoperativ smärta

HUR IDENTIFIERAR VI RISKPATIENTER?





PAIN MEDICINE

Pain Intensity on the First Day after Surgery

A Prospective Cohort Study Comparing 179 Surgical Procedures

Hans J. Gerbershagen, M.D., Ph.D.,* Sanjay Aduckathil, M.D.,† Albert J. M. van Wijck, M.D., Ph.D.,‡ Linda M. Peelen, Ph.D.,§ Cor J. Kalkman, M.D., Ph.D.,‖ Winfried Meissner, M.D., Ph.D.#

Anesthesiology 2013; 118:934-44

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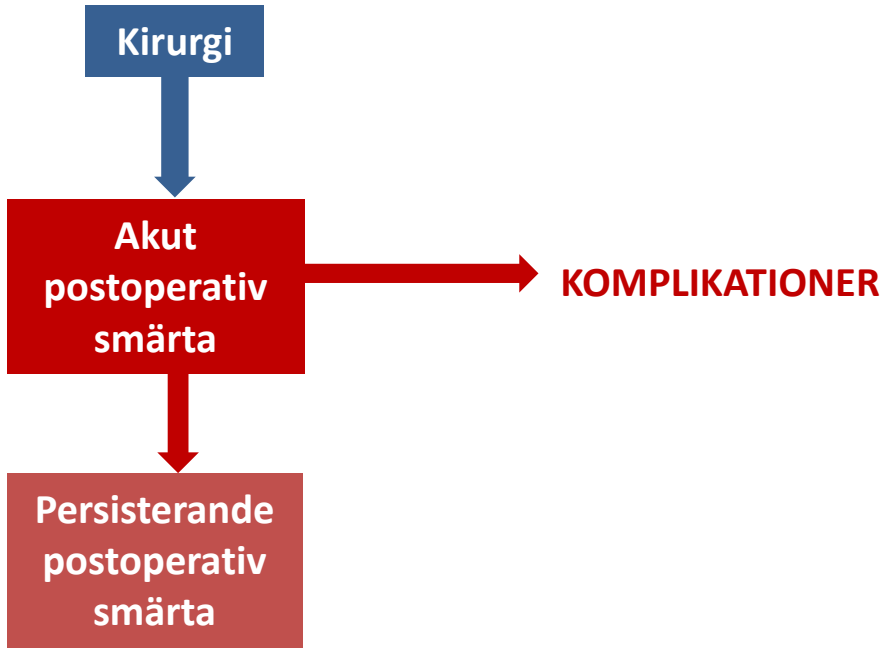
Komplikationer



- Försämrad sårläkning
- Dålig lungfunktion
- Ökad risk för trombos
- Sympatikus påslag och kardiovaskulär stress
- Hyperglykemi
- Persisterande postoperativ smärta
- Hindrad mobilisering och försenad rehabilitering

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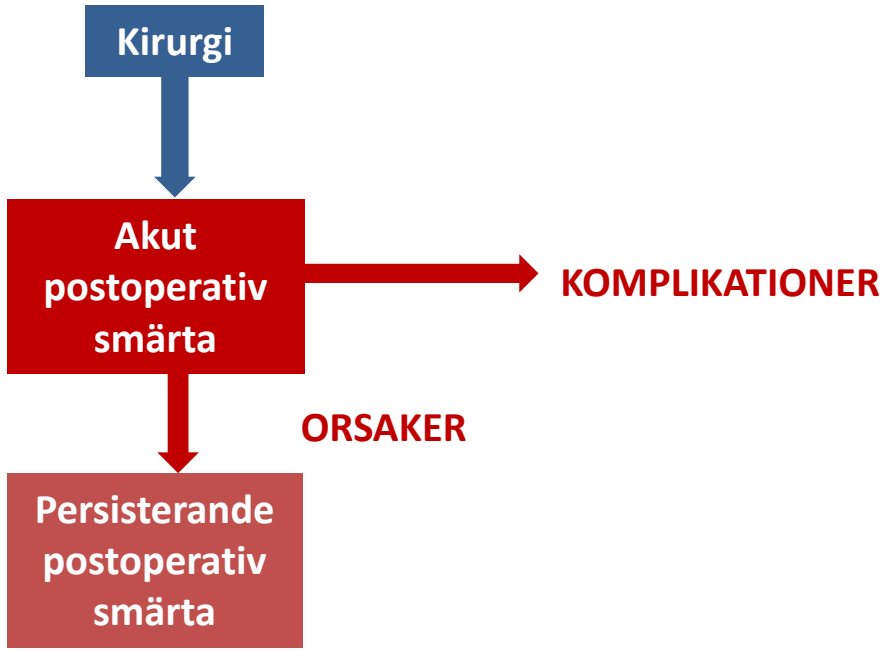
Orsaker



- Kvarvarande stimuli
- Hög smärtintensitet
- Stort smärtsamt område
- Tidigare smärtproblematik
- Nervskada
- Sensitisering
- Avsaknad av smärthämning
- Obalans i systemet för smärtsignalering och hämning

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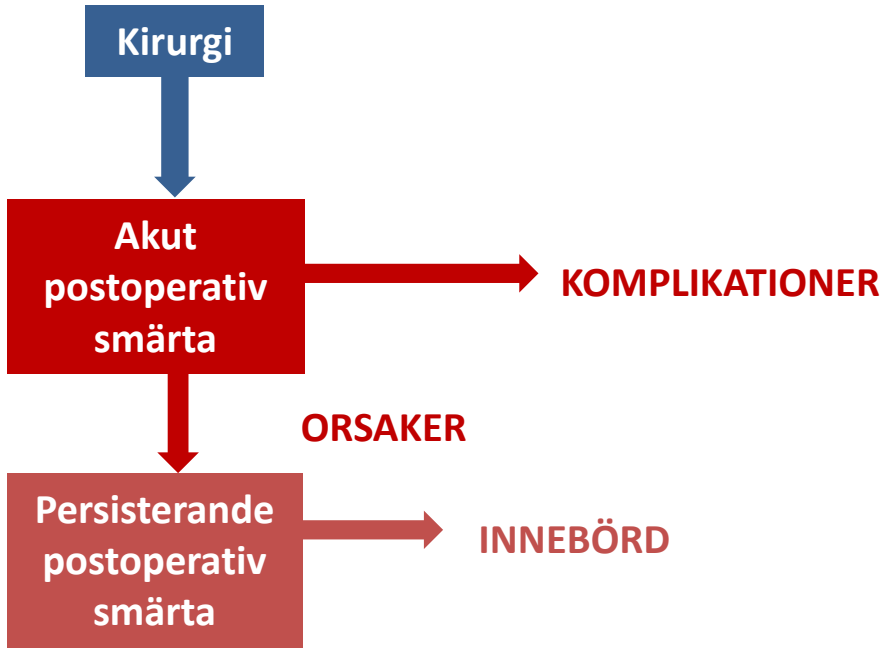
Innebörd för patienten



- Onödigt lidande
- Ångest och rädsla
- Dålig sömn
- Nedsatt autonomi
- Fysiskt handikapp
- Förlängd sjukskrivning
- Minskad livskvalitét

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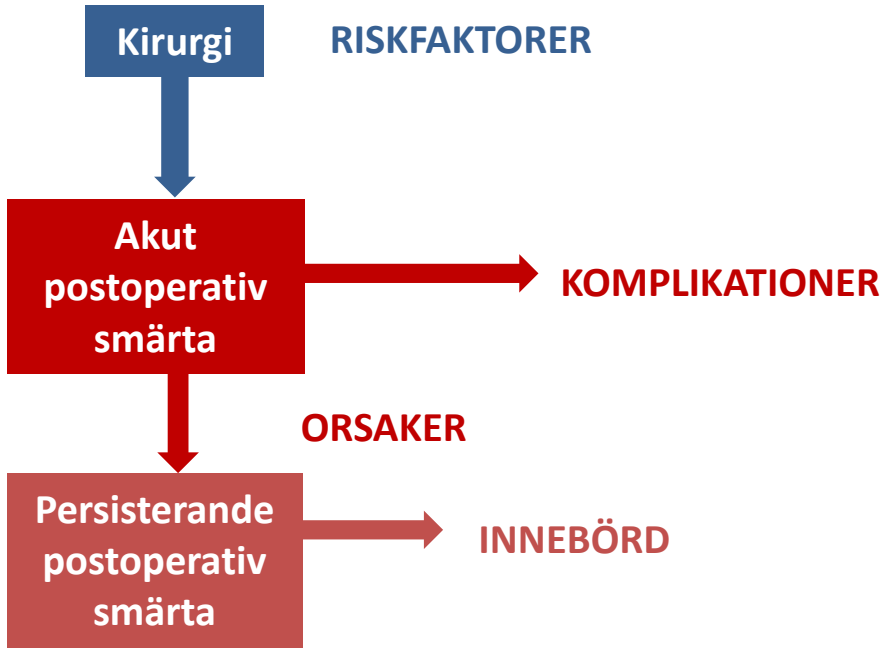
Riskfaktorer



- Kvinnligt kön
- Låg ålder
- Långvarig smärta före kirurgi
- Försämrad fysisk kapacitet
- Förväntan på ett smärtfritt förlopp
- Peroperativ nervskada
- Psykosociala faktorer
  - Ångest, oro, depression
  - Katastroftänkande
- Genetik?

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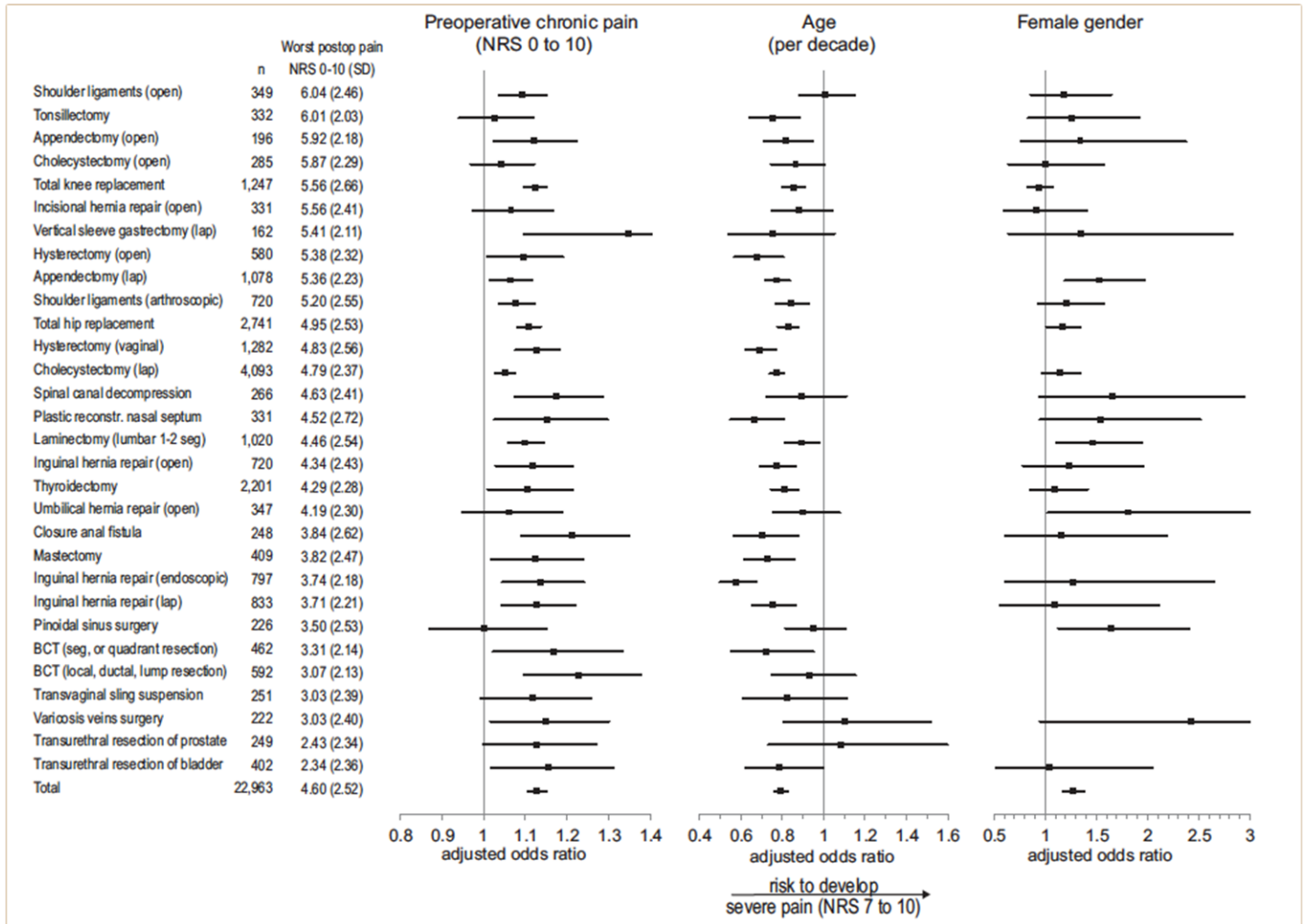
Procedure-specific Risk Factor Analysis for the Development of Severe Postoperative Pain

Hans J. Gerbershagen, M.D., Ph.D., Esther Pogatzki-Zahn, M.D., Ph.D., Sanjay Aduckathil, M.D., Linda M. Peelen, Ph.D., Teus H. Kappen, M.D., Albert J. M. van Wijck, M.D., Ph.D., Cor J. Kalkman, M.D., Ph.D., Winfried Meissner, M.D., Ph.D. (Anesthesiology 2014; 120:1237-45)



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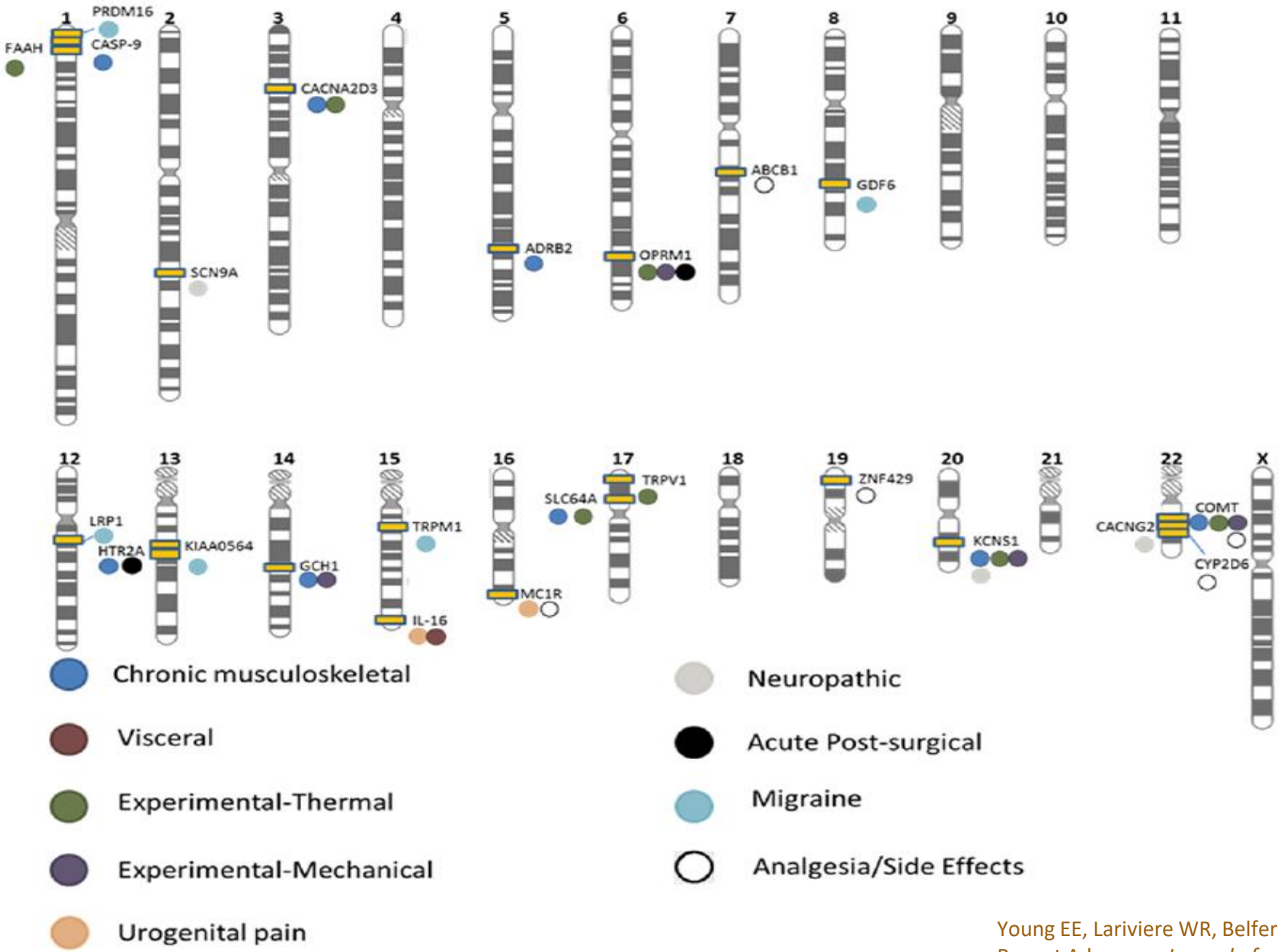

Young EE, Lariviere WR, Belfer I. Genetic Basis of Pain Variability: Recent Advances. *Journal of medical genetics*. 2012;49(1):10.1136/jmedgenet-2011-100386.

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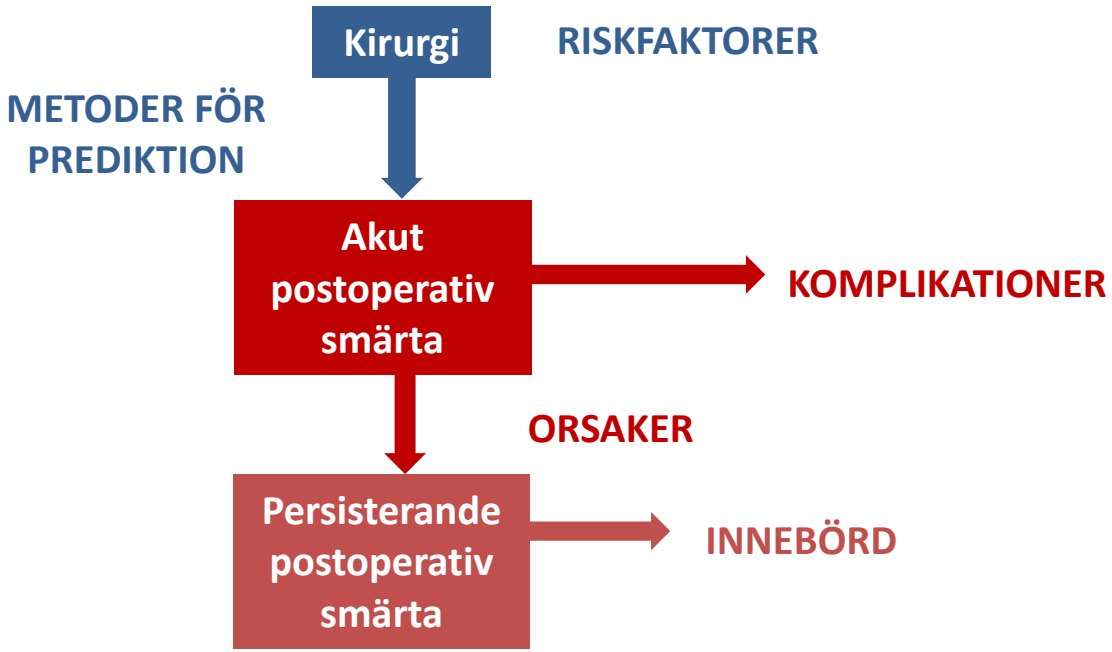
Metoder för prediktion



- Kvantitativ sensorisk testning (QST)
  - Elektrisk ström
  - Tryck
  - Kyla
  - Värme
  - Conditioned pain modulus
  - DNIC
- Psykometri
  - STAI
  - APAIS
  - HADS
  - PCS
  - ”Expected pain”
- Prediktionsmetoder

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Nyheter inom QST

- Kyla - tolerans och tröskelvärde

- Varmt vatten
- Tryck – smärttolerans

- Elektricitet – tröskel

- TSP
- CPM

Method of testing	Kind of surgery	Outcome measure	Pro	Con
Cold (suprathreshold)	Thoracoscopic surgery	APOP	Bayman et al. 2019	
	Total knee arthroplasty	APOP		Luna et al. 2017
Cold	Breast cancer surgery	POP	Lötsch et al. 2017	
Hot water	Breast cancer surgery	APOP	Rehberg et al. 2017	
Pressure pain tolerance	General surgery	APOP	Duan et al. 2017	
	Major urological, gynaecological, proctological or orthopaedic surgery	APOP	Wolmeister et al. 2020	
	Total knee arthroplasty	APOP	Luna et al. 2017	
	Total joint arthroplasty	APOP		Haghverdian et al. 2016
	Laparoscopic hysterectomy	PPOP		Lunde et al. 2020
Electrical pain threshold	Knee surgery	APOP		Thomazeau et al. 2016
	Total knee arthroplasty	APOP		Luna et al. 2017
	Laparoscopic cholecystectomy	APOP	Persson et al. 2017	
Temporal summation of pain	Total knee arthroplasty	APOP	Abrecht et al. 2019	
	Breast surgery	Pain at 2 weeks	Schreiber et al. 2019	
	Laparoscopic hysterectomy	PPOP		Lunde et al. 2020
Conditioned pain modulus	Total knee arthroplasty	PPOP	Larsen et al. 2021	
	Laparoscopic hysterectomy	PPOP		Lunde et al. 2020

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Psykometri

Method of testing	Kind of surgery	Outcome measure	Pro	Con
HADS	Knee surgery	APOP	Thomazeau et al. 2016	
PCS	Orthopedic surgery	Pain at 2 weeks	Alokozai et al. 2019	
	Hysterectomy	PPOP	Pinto et al. 2018	
	Bariatric surgery	Opioid use	Aceto et al. 2016	
	Knee arthroplasty	APOP		Abrecht et al. 2019
	VATS	APOP		Bayman et al. 2019
	Hysterectomy	APOP		Scheel et al. 2017
	Thoracic surgery	APOP PPOP		Horn-Hofmann et al. 2018
	Thoracic surgery	APOP		Grosen et al. 2016
Asking the patient	Upper extremity surgery	Pain at 2 weeks	Alokozai et al. 2019	R=0.28
	Thoracosocopic surgery	APOP	Bayman et al. 2019	R=0.43
PSQ	Cardiac surgery	APOP PPOP	Bjornnes et al. 2018	
	Breast cancer surgery	APOP	Rehberg et al. 2017	
PSEQ	Mixed surgery	APOP	Wang et al. 2018	
B-MEPS	Cancer surgery	APOP	Caumo et al. 2016	
	Major urological, gynecological, proctological or orthopaedic surgery	APOP	Wolmeister et al. 2020	
Sleep quality	Caesarean section	APOP	Orbach-Zinger et al. 2017	

Preoperative patient expectations had greater predictive value than other assessed variables including psychosocial factors such as catastrophizing or anxiety.

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Fråga patienten

- Övre extremitets kirurgi
  - Patienter ombads förutspå deras smärta inom 2 veckor
    - » Svag korrelation
    - » r=0.28 p=0.011
- Thorakoskopi
  - “Please rate your expected average pain on each of the three first postoperative days.”
    - » moderat korrelation mellan förväntad och observerad smärta
    - » r = 0.43; *P* < 0.001

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PSQ

- 17 frågor kring smärtsamma vardagssituation och hur man upplever det:
  - Föreställ dig att du slår I armbågen på en hård kant, tex soffbord. Hur smärtsamt skulle det upplevas?
    - 1-10
  - Föreställ dig att du bränner tungan på en varm dryck. Hur smärtsamt skulle du uppleva det
    - 1-10
- Osv…

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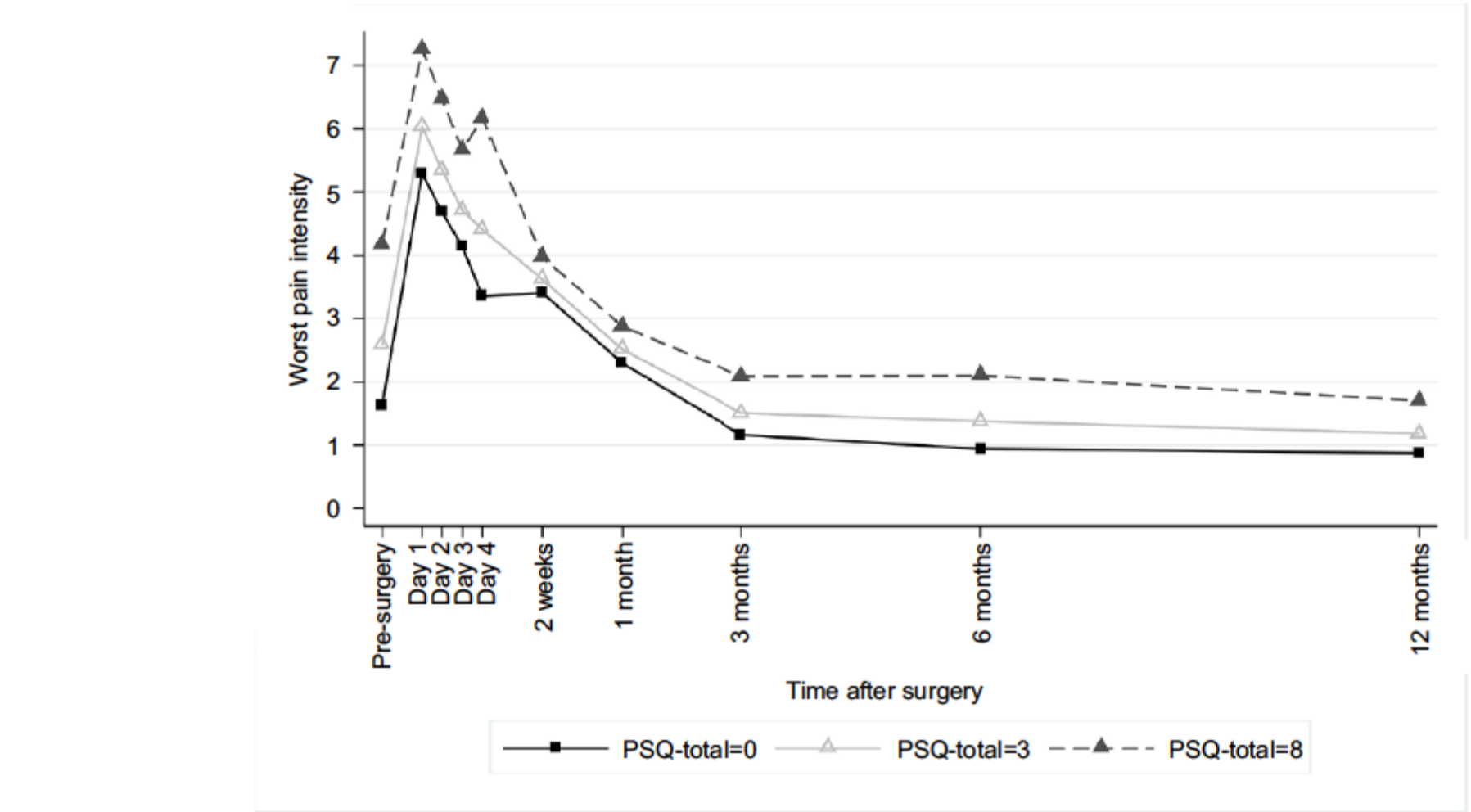
J Pain Research 2018, Bjornnes et al



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B-MEPS

Table 1. The refined version of B-MEPS tool. Instruction to patients: "These questions aim to assess your feelings of stress related to the perioperative period".

	Item content	Response scale			
1.	I am jittery	(1) not at all	(2) somewhat	(3) moderately	(4) very much so
2.	I feel indecisive	(1) not at all	(2) somewhat	(3) moderately	(4) very much so
3.	I am worried	(1) not at all	(2) somewhat	(3) moderately	(4) very much so
4.	I feel confused	(1) not at all	(2) somewhat	(3) moderately or very much so	
5.	I feel like a failure	(1) almost never	(2) often	(3) almost always	
6.	I worry too much over something that really doesn't matter	(1) almost never	(2) often	(3) almost always	
7.	I take disappointments so personally that I can't get them out of my mind	(1) almost never	(2) often	(3) almost always	
8.	I get in a state of tension or turmoil as I think over my recent concerns and interests	(1) almost never	(2) often	(3) almost always	
9.	Do you feel unhappy?	(1) No	(2) Yes		
10.	Do you have feelings of discomfort in the stomach?	(1) No	(2) Yes		
11.	How do you react when you are unhappy?	(1) I may look dispirited but I brighten up easily			
		(2) I have pervasive feelings of sadness or feel constantly gloomy			
12.	How do you describe your depressed mood?	(1) Ocasional sadness			
		(2) External factors can change it			
		(3) Being without help or hope			

B-MEPS, Brief Measure of Emotional Preoperative Stress.

- The Brief measure of preoperative stress scale
- Olika frågor från andra enkäter som
  - » STAI
  - » MADRS
  - » SRQ-20
  - » FSPQ
- Mål att få en emotionell utvärdering (upplevd stress) av peroperativa förloppet

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“Nya” metoder

Method of testing	Kind of surgery	Outcome measure	Pro	Con
VCP	Laparoscopic cholecystectomy	APOP	Persson et al. 2016	
	Mixed scheduled surgery	APOP	Persson et al. 2019	
	Laparoscopic nephrectomy	APOP	Peng et al. 2020	
Pain induced by pin-prick procedures	Total knee arthroplasty	APOP	Palanisami et al. 2020	
SPI	Laparatomy	APOP	Jung et al. 2020	
	Mixed scheduled surgery	APOP	Ledowski et al. 2016	
	Mixed scheduled surgery	APOP		Ledowski et al. 2019
PTI	Laparoscopic urological surgery	APOP	Wang et al. 2020	
qNOX score	Mixed scheduled surgery	APOP		Ledowksi et al. 2020
NOL index	Mixed scheduled surgery	APOP	Ledowski et al. 2021	

OR 3.5

OR 1.5

OR 3.5

Poor predictability

62 % sensitivity and 91 % specificity

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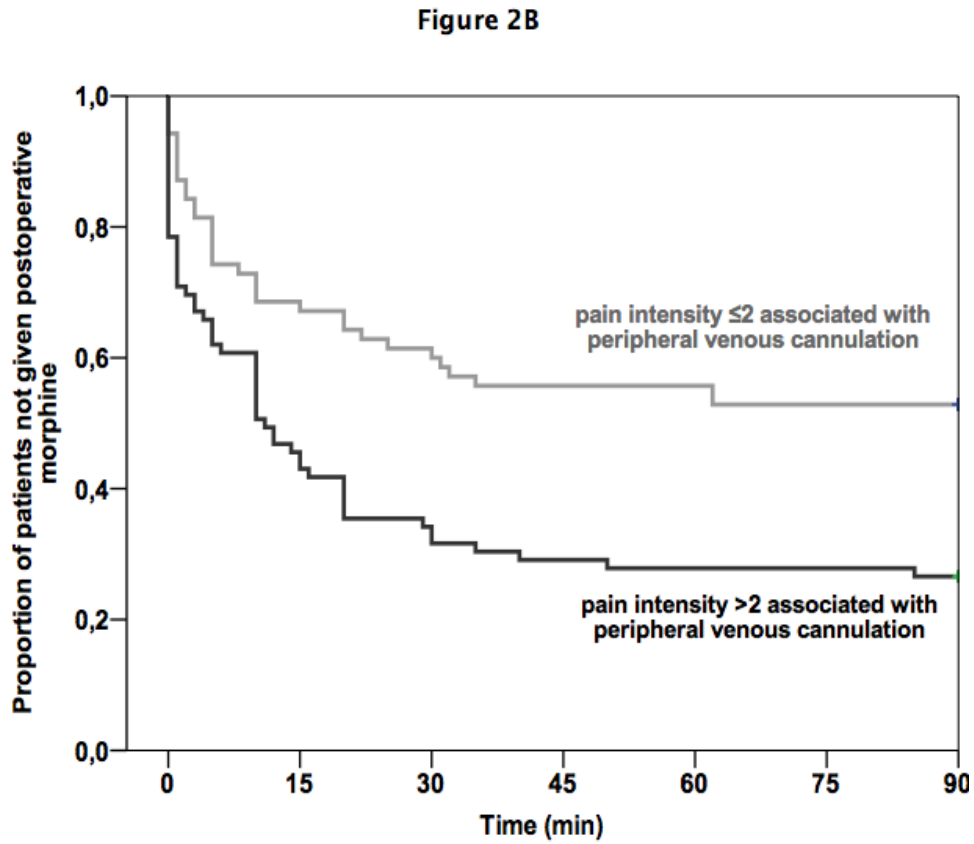
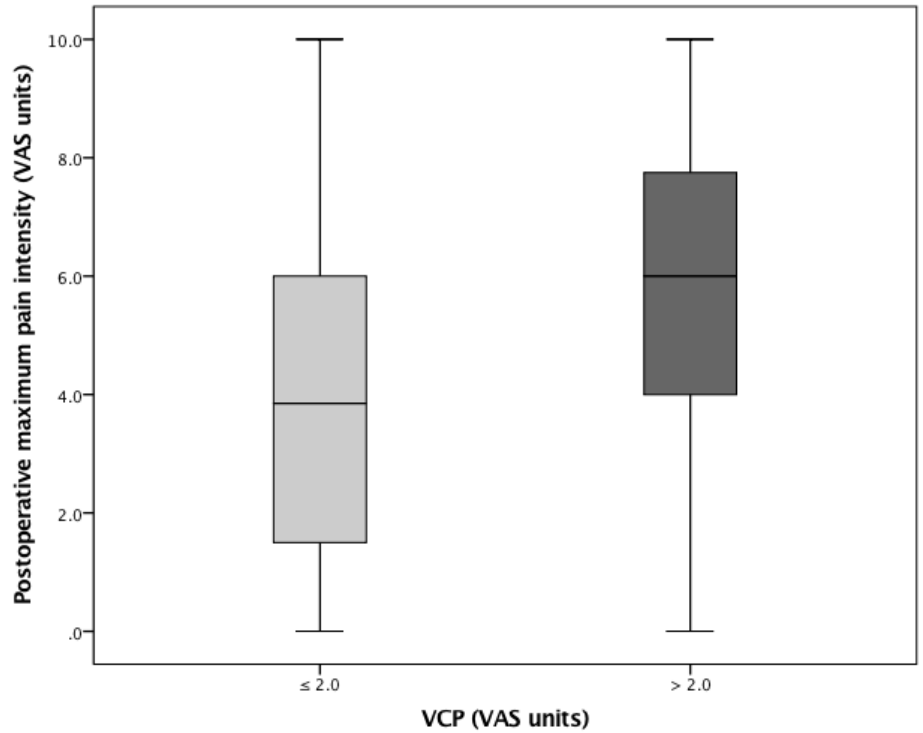
Kan man använda smärtskattning vid nålsättning för att förutsäga graden av smärta efter kirurgi?





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	Univariate analysis		Multivariate analysis	
	OR (95% CI)	*P*-value	OR (95% CI)	P-value
Venous cannulation-induced pain intensity (VAS units)				
≤ 2.0	1.0		1.0	
> 2.0	3.4 (1.7-6.9)	< 0.001	3.4 (1.6-7.3)	< 0.005
Gender				
Men	1.0		1.0	
Women	1.8 (0.9-3.7)	0.1	1.1 (0.5-2.5)	0.8
Age (years)				
≤ 40	3.5 (1.3-9.2)	< 0.05	2.1 (0.8-6.0)	0.2
41-59	1.3 (0.6-2.9)		0.9 (0.4-2.1)	
≥ 60	1.0		1.0	

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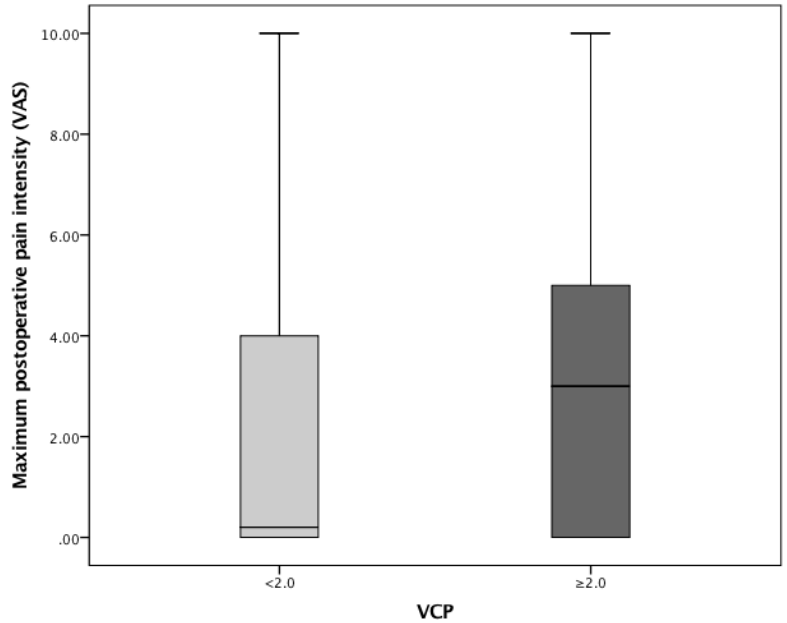

	Univariate analysis		Multivariate analysis	
	OR (95% CI)	*P*-value	OR (95% CI)	P-value
Venous cannulation-induced pain intensity (VAS units)				
< 2.0	1.0		1.0	
≥ 2.0	1.7 (1.2-2.6)	0.005	1.5 (1.0-2.3)	0.044
Gender				
Men	1.0		1.0	
Women	1.6 (1.0-2.4)	0.036	1.5 (1.0-2.2)	0.08
Age (years)				
≤ 40	1.5 (0.9-2.3)	0.002	0.5 (0.3-0.7)	0.006
41-59	2.4 (1.5-3.8)		0.6 (0.4-1.0)	
≥ 60	1.0		1.0	

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Peng et al. BMC Anesthesiology (2020) 20:86
https://doi.org/10.1186/s12871-020-01003-z

BMC Anesthesiology

RESEARCH ARTICLE Open Access

Application of preoperative assessment of pain induced by venous cannulation in predicting postoperative pain in patients under laparoscopic nephrectomy: a prospective observational study

Fei Peng, Yanshuang Li, Yanqiu Ai, Jianjun Yang and Yanping Wang*

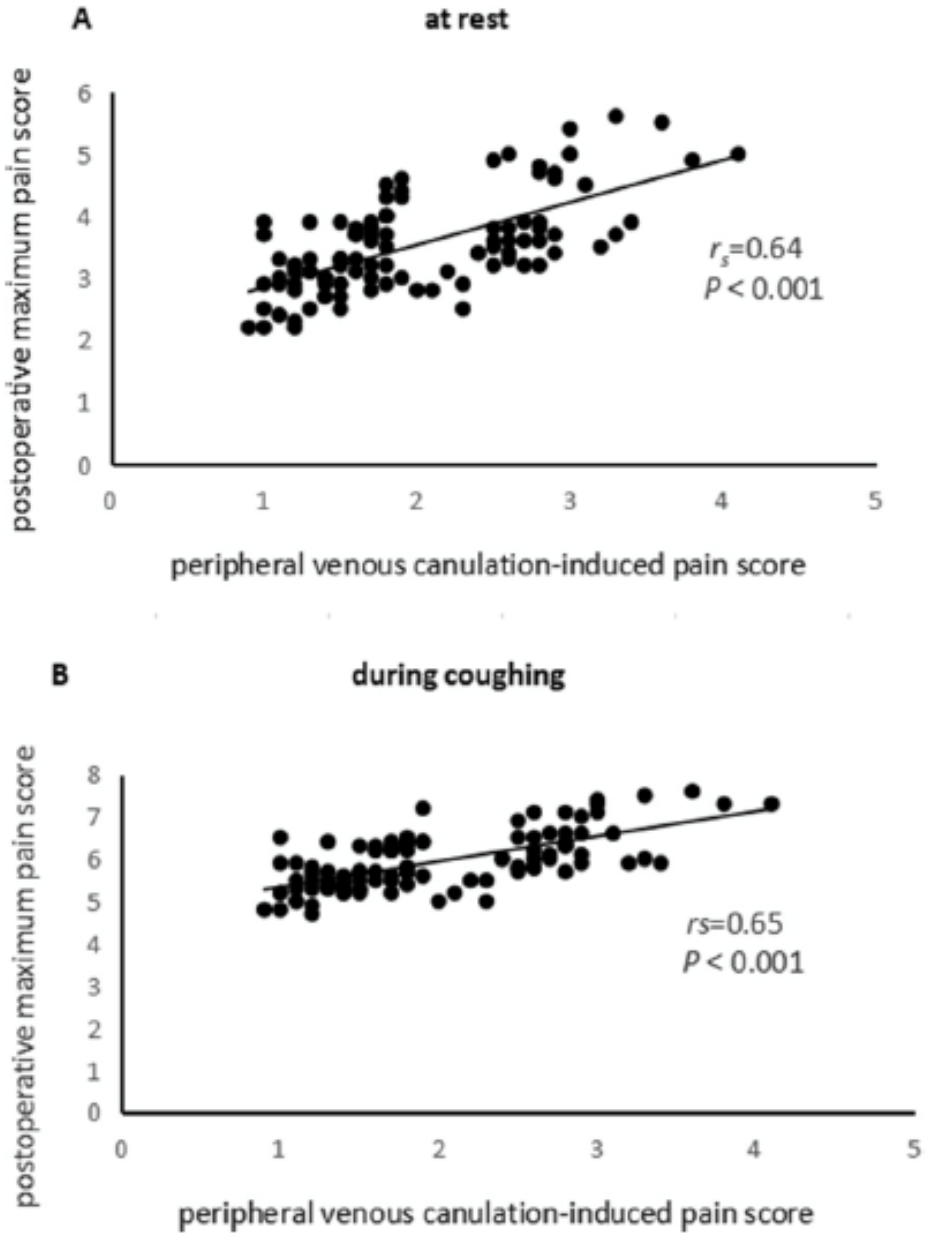

Fig. 2 Scatter plot of peripheral venous cannulation-induced pain score and postoperative maximum pain score (**a**) at rest, (**b**) during coughing

Table 2 Bivariate correlations between venous cannulation-induced pain score and outcome variables

	Correlation coefficient (r_s)
Postoperative maximum pain score at rest	0.64*
Postoperative maximum pain score during coughing	0.65*
Effective times of pressing	0.59*
Additional consumption of sulfentanil, μg	0.58*

*meant $P < 0.05$

Table 5 Logistic regression analysis of the ability of venous cannulation-induced pain score (≥ / < 2.0 VAS units) to predict postoperative pain intensity ≥4.0 VAS units

	multivariate analysis	
	OR(95% CI)	*P* value
Venous cannulation-induced pain score (VAS units)		
< 2.0	1.0(ref)	0.012
≥ 2.0	3.5 (1.3–9.3)	

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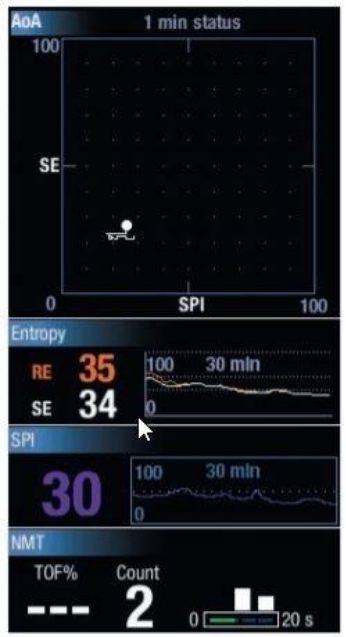
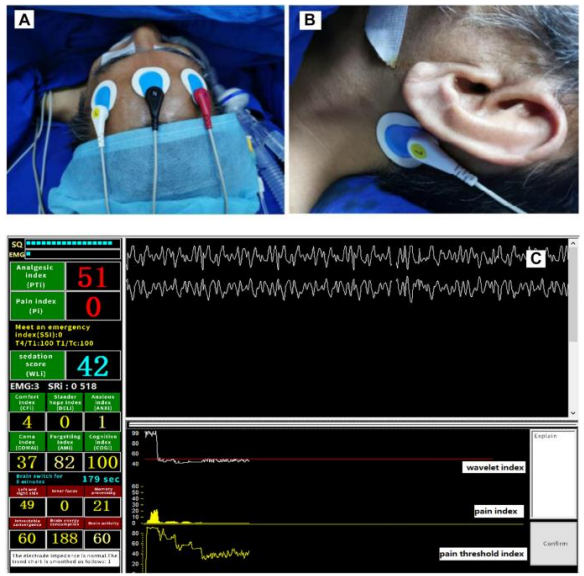
Kommersiella metoder

- SPI - Surgical Pleth Index
- hemodynamiskt svar på olika kirurgiska stimulin under anestesi
- photopletysmografisk puls våg + HR intervall



- PTI - Pain threshold index
- EEG signaler
- Värde 0-100
- Monitorerar svaret på smärtfulla stimuli



- qNOX
  - EEG analys
  - Designat för peroperativ monitorering av nociception
- NOL index
  - The Nociception Level (NOL) index score (0-100)
  - Konduktans I huden, heart rate variability, accelerometer, och temperatur från en finger-elektrod.

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Kombinerade tester

Method of testing	Kind of surgery	Outcome measure	Reference	
1. High levels of preoperative pain 2. Expected pain after surgery 3. Proposed extensive surgery	Mixed day surgery	APOP	Stessel et al. 2017	AUC=0.78
1. PPT 2. PCS	Total knee arthroplasty	APOP	Luna et al. 2017	71 % sensitivity and 62 % specificity
1. Preoperative pain 2. CPM 3. PCS	Total knee arthroplasty	PPOP	Larsen et al. 2021	explained 20.5% of variance 12 m
1. Preoperative pain within the proposed field of surgery 2. Movement-evoked APOP at 5 days 3. Other preoperative chronic pain 4. Female gender	Orthopaedic, neuro-, general or abdominal surgery	PPOP	Mathes et al. 2017	75 % sensitivity and 73 % specificity
1. Preoperative pain within the proposed field of surgery 2. High body mass index 3. Axillary node dissection 4. Severe APOP	Breast cancer surgery	PPOP	Meretoja et al. 2017	ROC-AUC 0.74
1. Kind of surgery 2. Medical history 3. Duration of surgery	Mixed ambulatory surgery	APOP	Nair et al. 2020	to predict postoperative opioid requirements with approximately 70 % accuracy

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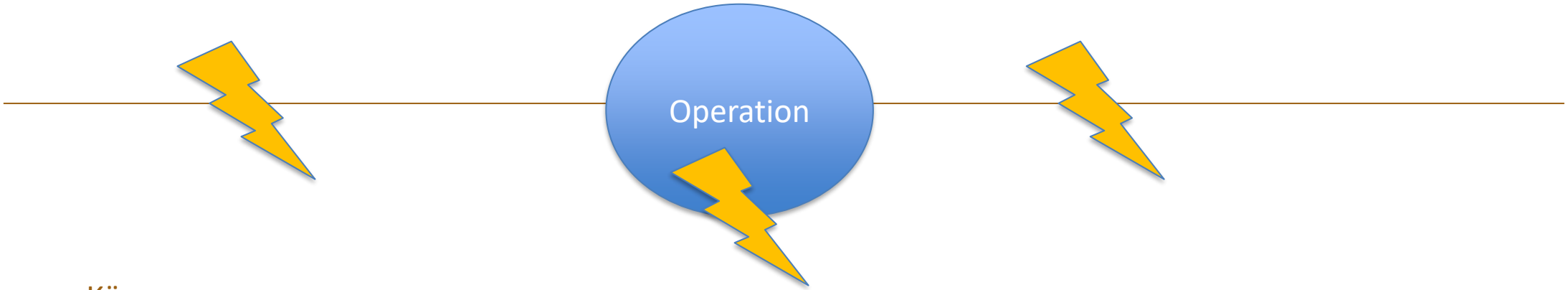
Hur kan vi
använda oss av
detta?



- Kön
- Ålder
- Preop smärta
- Förväntad smärta
- PCS?
- Sömn?
- PSQ?
- PSEQ?
- B-MEPS?

VCP
Pin-prick
PTI
SPI
qNOX

APOP

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1. Vad ska göras med patienten?

- Typ av kirurgi?
  - Procedure-specific optimized treatment protocols
- Risk för långvarig smärta?

2. Har patienten riskfaktorer?

- Kvinnligt kön
- Ung ålder
- Långvarig preoperativ smärta
- Psykosociala faktorer?
  - Ångest, oro
  - Katastroftänkande
  - Depression

Tänk på att patienter som själv tror att de kommer att få ont ofta har rätt!

3. Smärtkänslighet?

- VAS ≥ 2.0 vid nålsättning?

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Individualiserat omhändertagande

- Optimera smärtlindring
  - Premedicinering
  - Adjuvant analgetika
  - Blockader
- Planera postoperativ behandling
- Uppföljning?
  - APS

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