Management of peri-operative pain

Ruolun Wang

The Second Clinical College of Guangzhou Medical University

Ruolun Wang

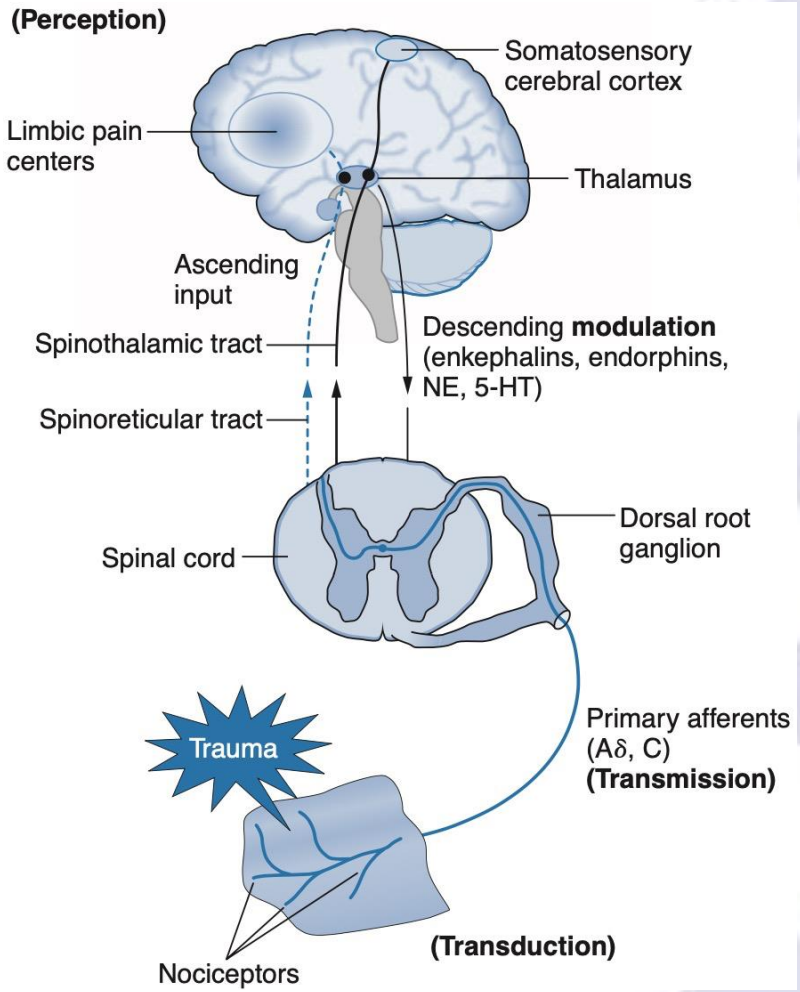
Senior Chief Pharmacist

Supervisor Master

- **Director of Pharmacy Department of the Second Affiliated Hospital of Guangzhou Medical University.**
- **Chairperson of the Therapeutics Committee of the Guangdong Provincial Pharmaceutical Association**
- **The surgical pharmacy team's management led by her in perioperative analgesia, anti-infection, antiemesis, and other aspects has resulted in a reduction of both the length of hospital stay and the hospitalization cost.**
- **Led and drafted the "Guidelines for Postoperative Pain Management by Clinical Pharmacists", FIP**
- **Participated in the editing of "Pharmaceutical Care in Surgery" and "Pain Management" books, wrote over 10 expert consensus papers related to surgical pharmacy and published 8 SCI papers.**

- Pain and peri-operative pain
- Analgesic medication
- A case of Perioperative pain management
- Summary

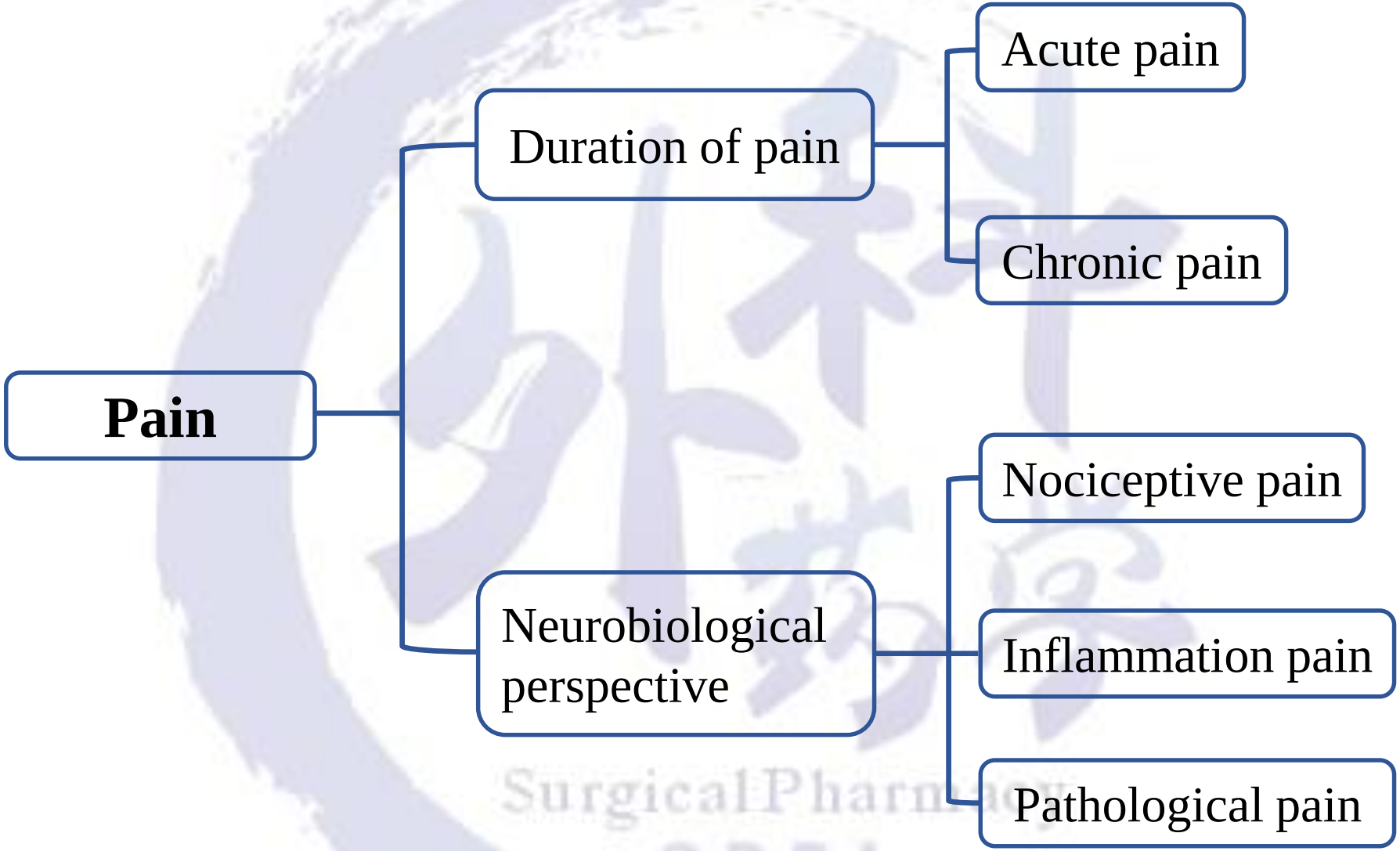
- ➢Pain and peri-operative pain
- ➢Analgesic medication
- ➢A case of Perioperative pain management
- Summary



The fifth vital sign-Pain:

An unpleasant sensory and emotional experience associated with, or resembling that associated with, actual or potential tissue damage.

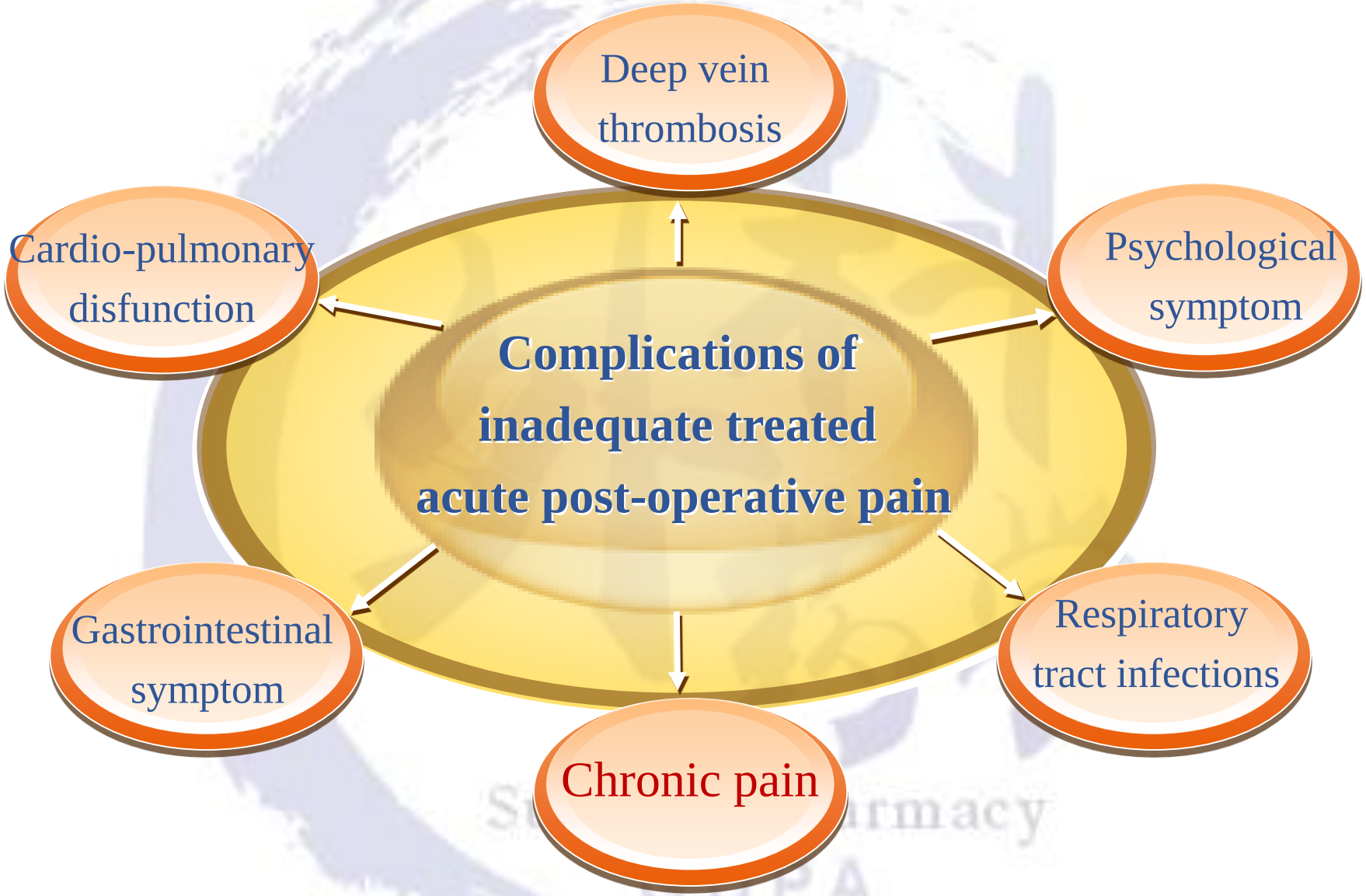
Srinivasa N. Raja, et al. *Pain*.2020


Pain
Duration of pain
Acute pain
Chronic pain
Neurobiological perspective
Nociceptive pain
Inflammation pain
Pathological pain

Pain assessment

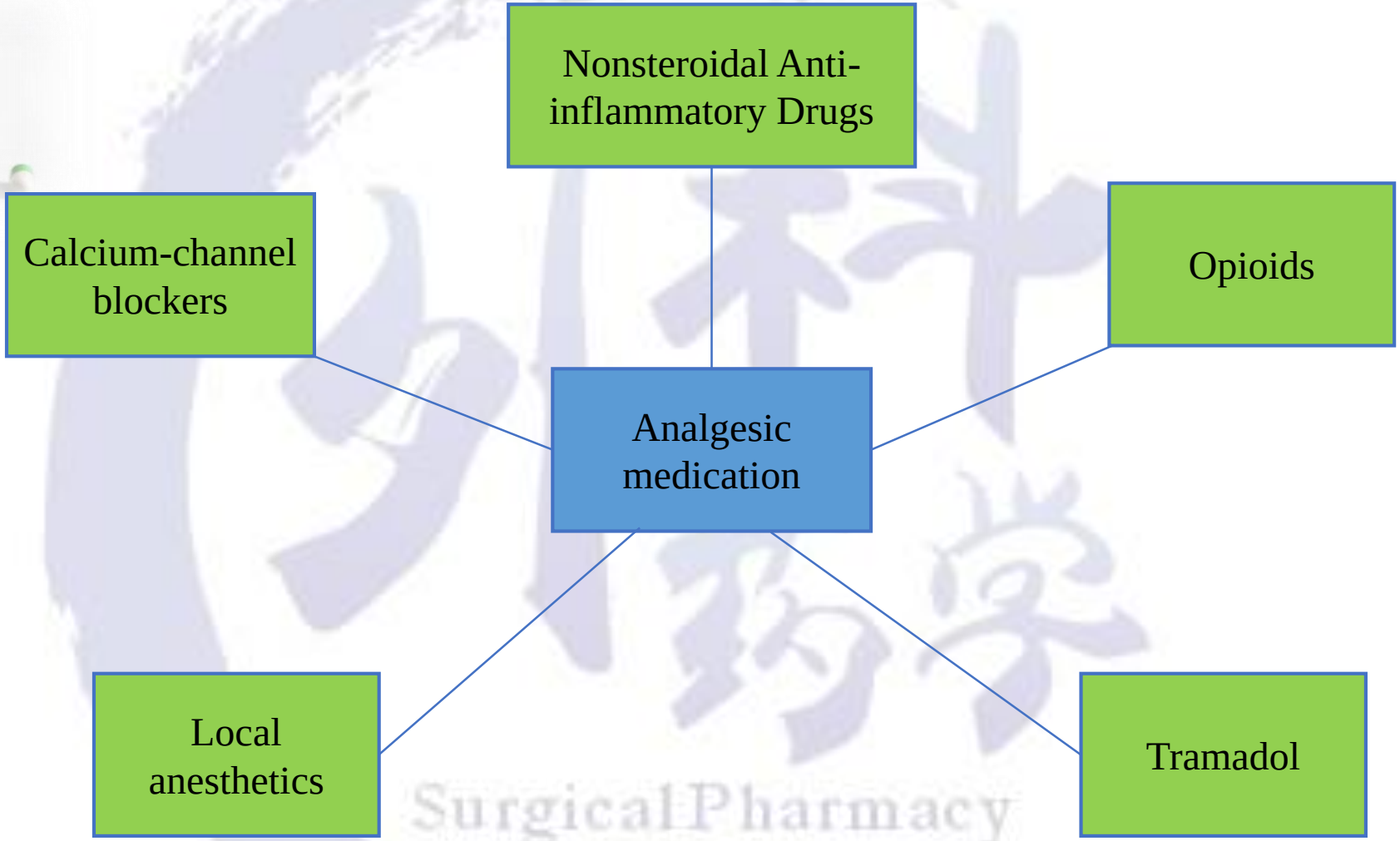
- gather details about the pattern, duration, location, and character of the pain
- find out what makes the pain worse and what makes it better
- what medications and nonpharmacologic therapies have been tried in the past and what was the result of that trial
- intensity of pain,which is one of the most important assessments in acute pain

Degree of pain

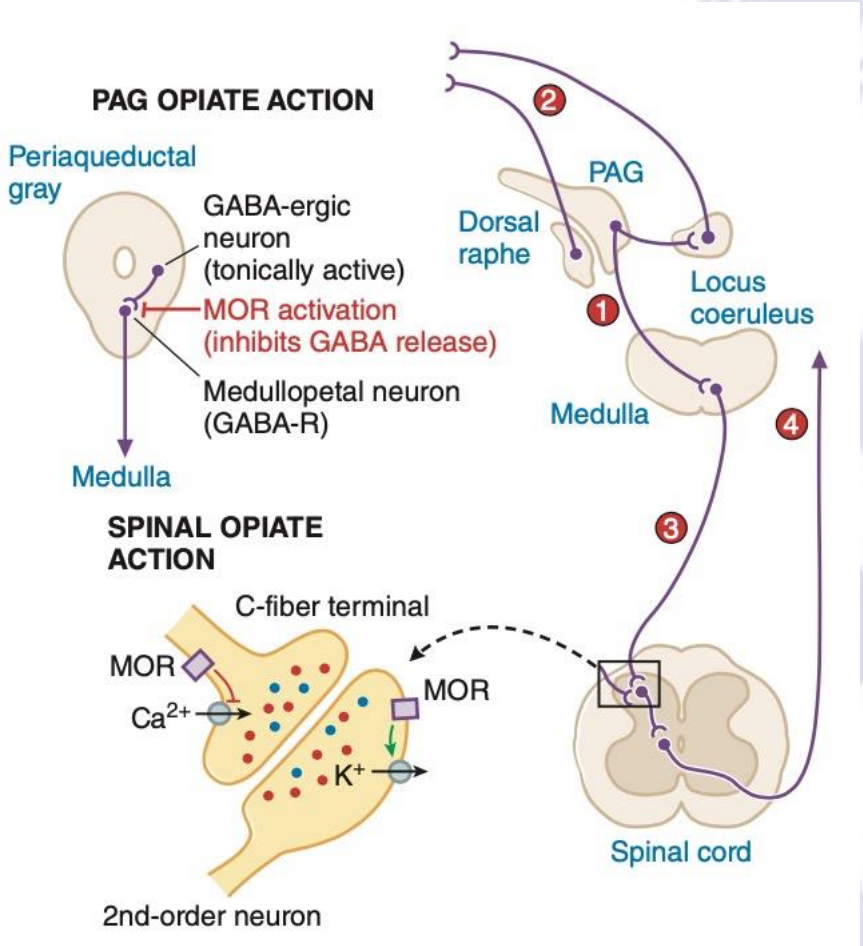


Thomas MA. *Ochsner J*. 2003.

- Pain and peri-operative pain
- **Analgesic medication**
- A case of Perioperative pain management
- Summary



Opioids Analgesics



- the cornerstone treatment for moderate and severe acute pain
- **opioid receptors agonists** (e.g. morphine, fentanyl):used for moderate and severe postoperative acute pain
- **mixed opioid receptors agonists/antagonists**(e.g. buprenorphine): used for moderate postoperative pain or as part of multimodal analgesia for severe pain
- weaker opioid drugs(e.g. codeine, dihydrocodeine):used for mild and moderate postoperative acute pain

Goodman and Gilman's The Pharmacological Basis of Therapeutics, 14th edition

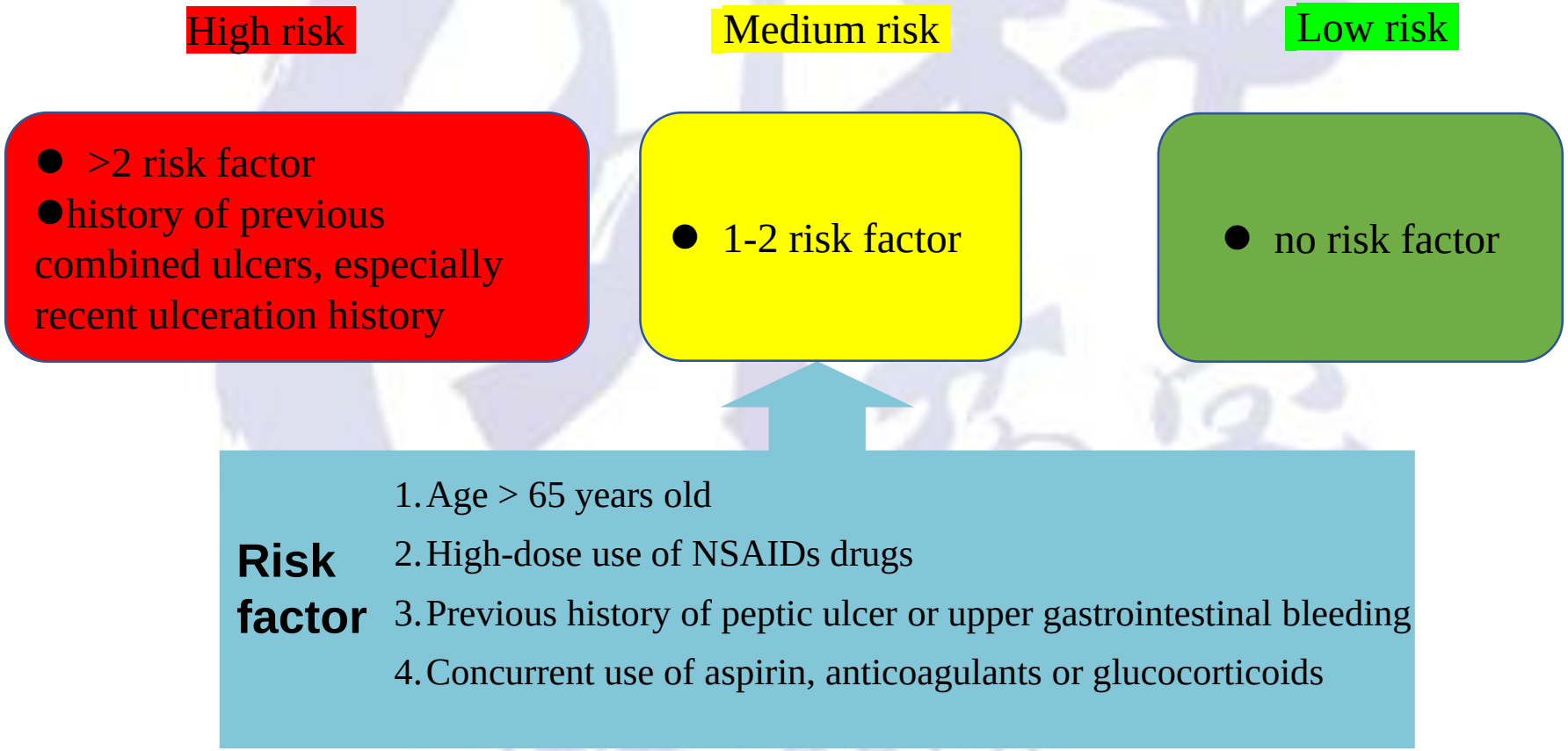
Opioids Analgesics

- **strong analgesic effects**
- **no ceiling effects**
- **no organ toxicity**
- **common adverse reactions:**nausea, vomiting, constipation; respiratory depression; itching; muscle rigidity, clonic convulsion, and seizures; sedation and cognitive impairment; miosis; hypothermia; immunosuppression; physical dependence and psychological dependence
- **the analgesic effect and adverse reactions are both dose-dependent and receptor-dependent.**

NSAIDs

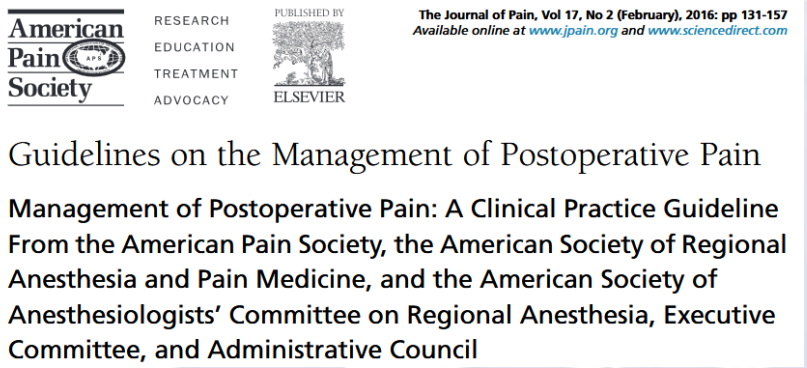
- **High protein binding rate (95 - 99%)**
- **For other drugs with high protein binding rates, NSAIDs can replace other drugs that bind to proteins and increase the free drug concentration of this drug.**
- **"Cap effect", cannot exceed the dosage limit**
- **Among the same type of drugs, if one drug is ineffective, another drug may still have a good effect**

Assess the gastrointestinal risks of patients; identify high-risk patients



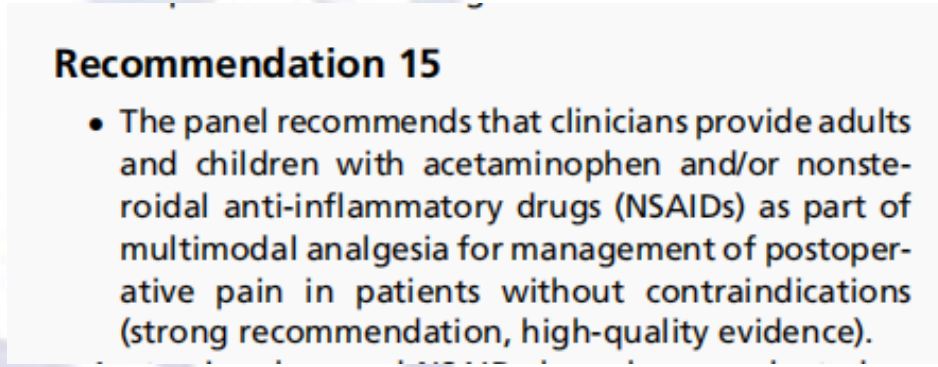
Lanza FL,et al.Am J Gastroenterol. 2009;104(3):728-38.

NSAIDs
assessing the patient's risk factors.


American Pain Society
RESEARCH
EDUCATION
TREATMENT
ADVOCACY
PUBLISHED BY ELSEVIER
The Journal of Pain, Vol 17, No 2 (February), 2016: pp 131-157
Available online at www.jpain.org and www.sciencedirect.com

Guidelines on the Management of Postoperative Pain

Management of Postoperative Pain: A Clinical Practice Guideline From the American Pain Society, the American Society of Regional Anesthesia and Pain Medicine, and the American Society of Anesthesiologists' Committee on Regional Anesthesia, Executive Committee, and Administrative Council


Recommendation 15

- The panel recommends that clinicians provide adults and children with acetaminophen and/or nonsteroidal anti-inflammatory drugs (NSAIDs) as part of multimodal analgesia for management of postoperative pain in patients without contraindications (strong recommendation, high-quality evidence).

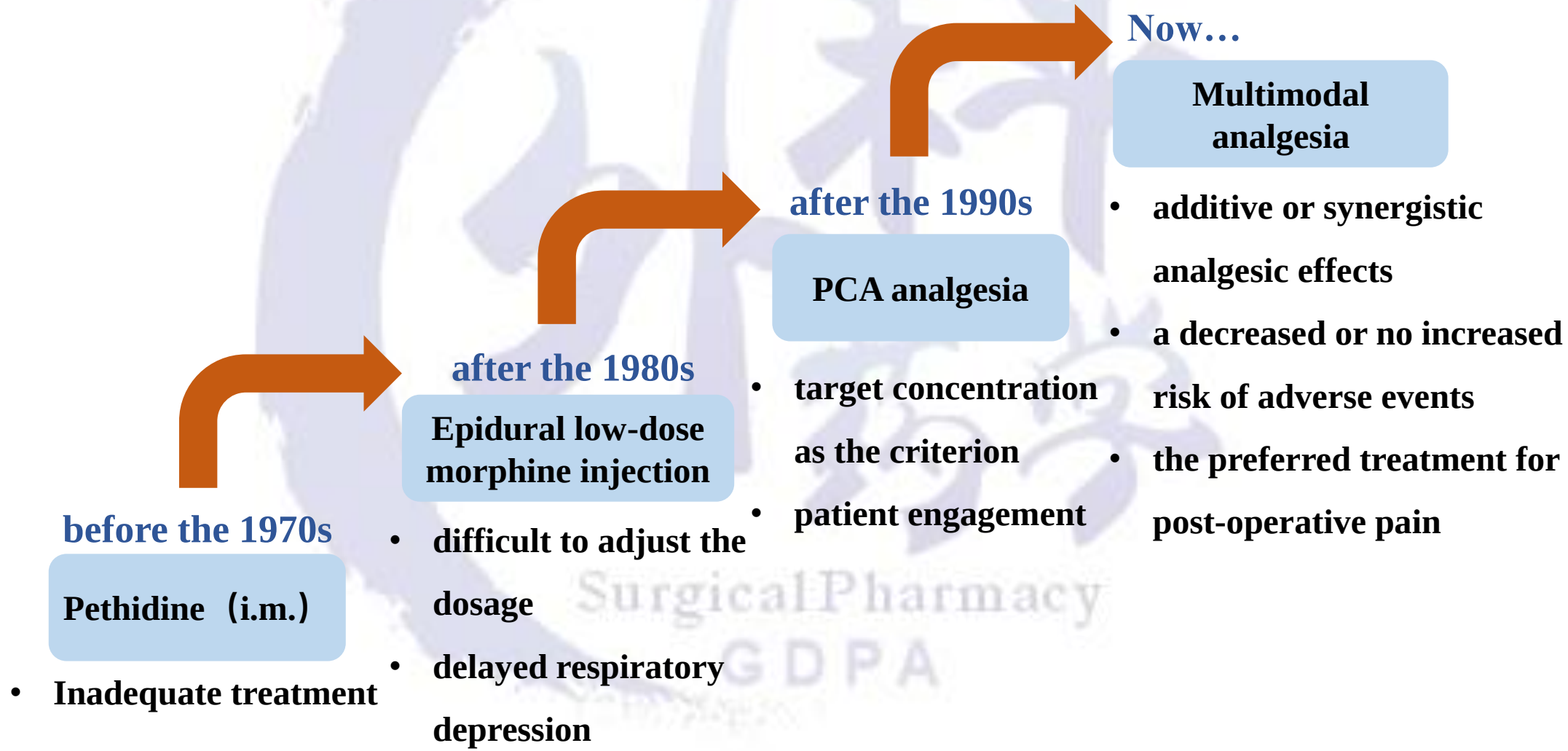
- The risk factors that need to be evaluated when choosing NSAIDs include: [1, 2]
- Gastrointestinal
- bleeding
- Cardiovascular system
- ……

1.The Journal of Pain, Vol 17, No 2 (February), 2016: pp 131-1571

Acetaminophen

- **Acetylaniline antipyretic and analgesic drugs**
- **Action site: COX-3 in the brain, by inhibiting COX-3 in the central nervous system, reducing the synthesis of prostaglandin E2 (PGE2) in the brain to achieve the effect of pain relief**
- **Strong analgesic and antipyretic effects, weak anti-inflammatory activity;**
- **Within the recommended dosage range, it has good safety and tolerability**
- **Main toxic side effects: Hepatotoxicity**

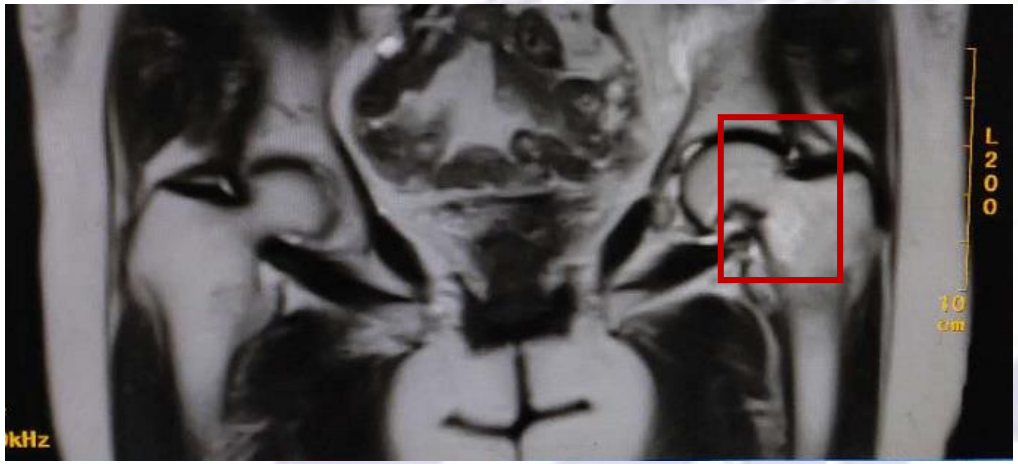
The development of post-operative analgesia

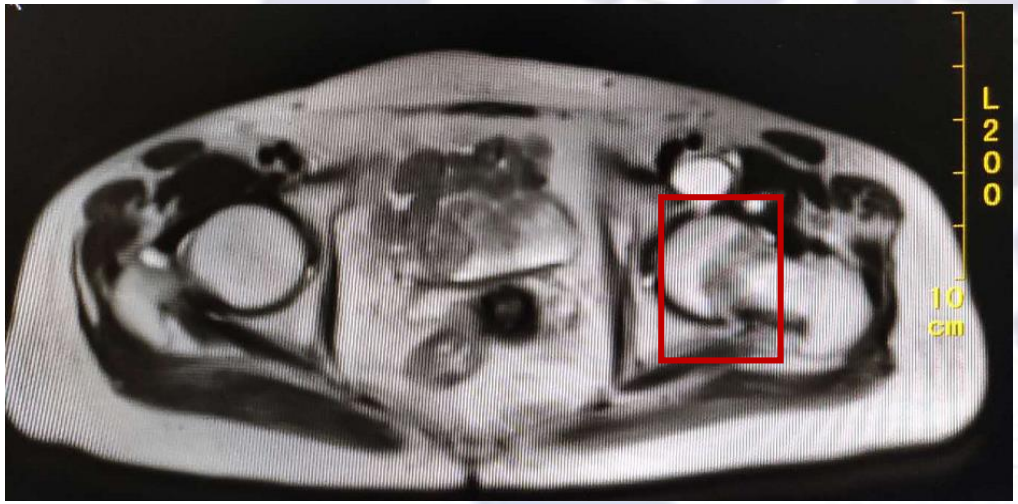


- Pain and peri-operative pain
- Analgesic medication
- **A case of Perioperative pain management**
- Summary

Patient’s basic information:

A 78-year-old, 53-kg woman, was admitted to the hospital for treatment due to pain in her left hip caused by a sprain, and limited mobility of the left hip joint for one month. She has no past medical history. Her **vital signs** were BP 152/95 mm Hg, pulse 67 beats/minute, respirations 20 breaths/minute, and temperature 36.5 ℃.


L200
10
cm


L200
10
cm

Diagnosis and Treatment

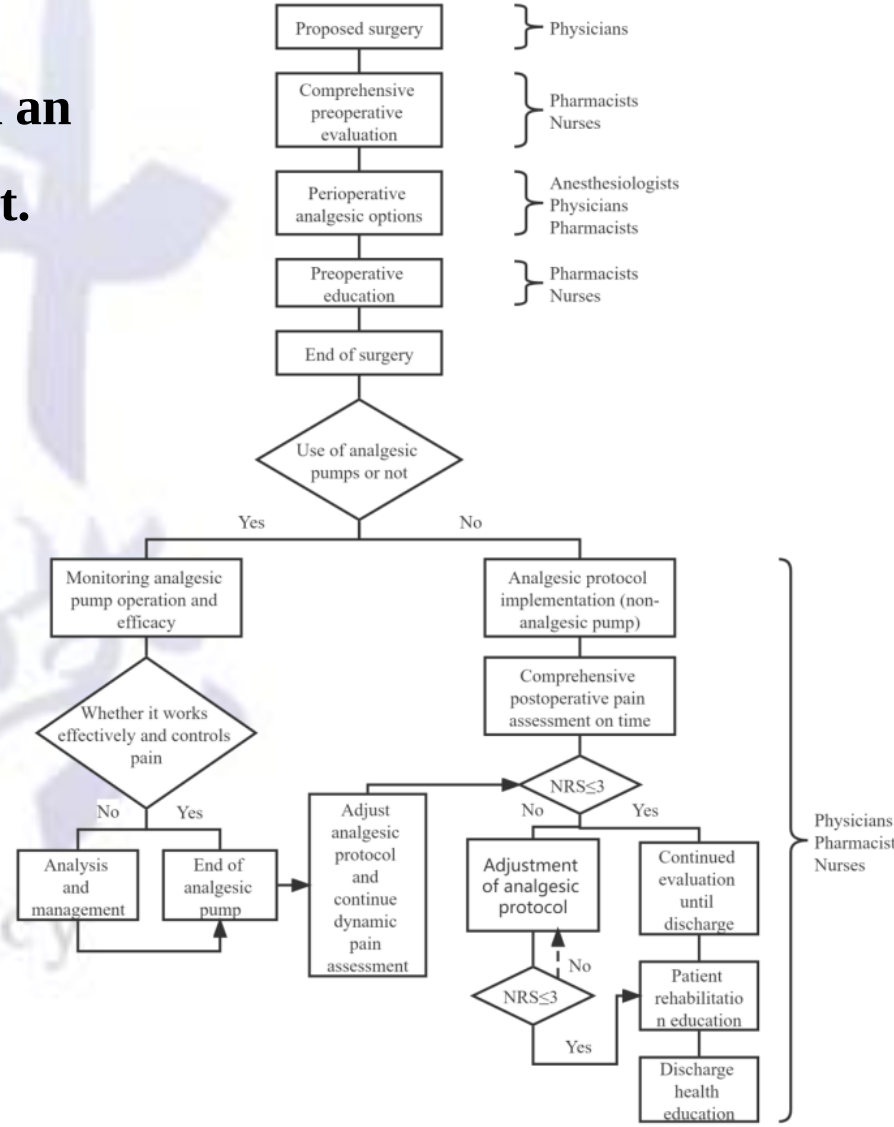
Scheduled for May 9th, a "left femoral head prosthesis replacement surgery" will be performed.

- Hip prosthesis replacement surgery is a major orthopedic joint surgery and is considered a severe pain surgery [1]. The incidence of chronic pain after the operation is 23%; approximately 2% of patients experience even more severe pain after the surgery than before [2].
- The pain of this patient mainly includes the pain caused by the preoperative femoral head fracture and the pain resulting from the surgical trauma after the operation.
- Therefore, the pain management for this patient during the operation, intraoperative period, postoperative period and during the home rehabilitation after discharge should be carried out throughout.

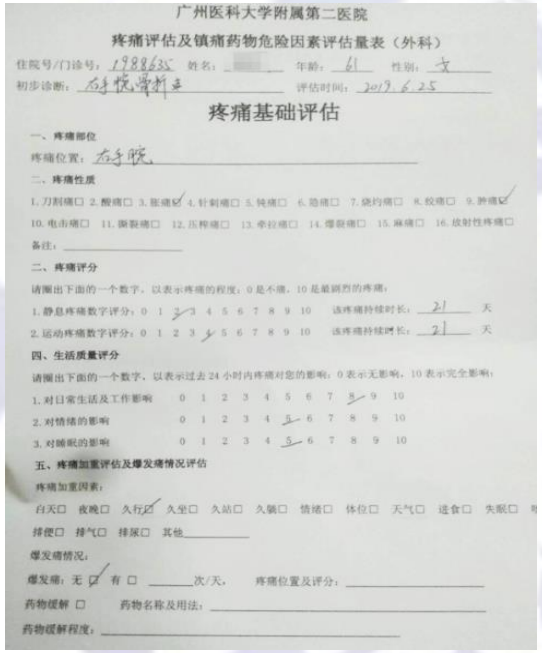
[1]《Expert Consensus on Accelerated Recovery after Hip and Knee Arthroplasty in China: Management of Perioperative Pain and Sleep》（2016）
[2] Wylde V, Hewlett S, Learmonth ID, et al. Persistent pain after joint replacement: prevalence, sensory qualities, and postoperative determinants. Pain, 2011, 152(3): 566-572

Acute Pain Service-Multi-Disciplinary Treatment （APS-MDT）

The Third Department of Orthopedics in our hospital has established an APS-MDT treatment group, covering perioperative pain management. The members include orthopedic doctors, surgical pharmacists, anesthesiologists and nurses.



Assessment of motion

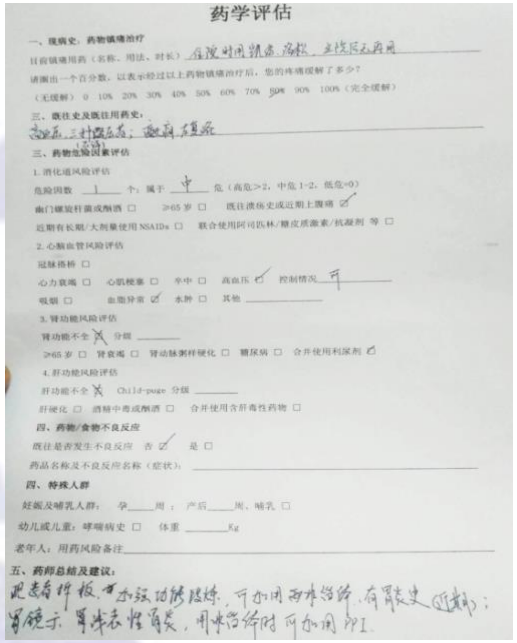


广州医科大学附属第二医院

疼痛评估及镇痛药物危险因素评估量表（外科）

疼痛基础评估

Pain assessment scale



药学评估

Assessment of medication therapy

Pain assessment before operation:

The patient primarily presented with swelling and pain in the left hip, with occasional instances of pain-induced nocturnal awakenings, resulting in poor sleep quality.

Her numeric rating scale scores were 4 points at rest and 6 points with movement.

Pharmaceutical assessment[1-3]:

1. Oral celecoxib 200mg twice daily for pain relief has been used for 2 weeks, with moderate efficacy;
2. Hypertension, no medical treatment, occasionally oral irbesartan 150mg, poor blood pressure control;
3. Pain affecting sleep, about 5 nights a week, oral alprazolam 0.4mg has been taken, now has been discontinued for 1 day;
4. Gastrointestinal injury risk score 2 points, moderate risk;
5. Postoperative vomiting (PONV) risk score 2 points, occurrence probability about 40%;

[1]《Recommendations on the Prevention and Treatment of Gastrointestinal Ulcers and Ulcer Complications Associated with Non-steroidal Anti-inflammatory Drugs》（2017）
[2]《Expert Consensus on Prevention and Treatment of Postoperative Nausea and Vomiting》（2014）
[3]《Expert Consensus on Hypertension Management during the Perioperative Period》（2016）

Recommendations[1-3]:

1. Perioperative preventive analgesia principle [1]: Continue taking celecoxib 200mg twice daily one day before surgery;

2. Perioperative antihypertensive drug use [2]: Discontinue ARB drugs and switch to oral amlodipine tablets 5mg once daily, monitor blood pressure;

3. Moderate risk of gastrointestinal injury [4]: Add oral omeprazole enteric-coated capsules 20mg once daily;

4. PONV is of moderate risk [5]: Administer paraloryssone 0.075mg intravenously before induction anesthesia;

5. Joint preoperative education by pharmacy and nursing (video + educational booklet + bedside education).

[1] "Guidelines for Clinical Pharmacists' Involvement in Postoperative Pain Management" (2019)
[2] "Expert Consensus on Hypertension Management during the Perioperative Period" (2016)
[3] "Recommendations on Prevention and Treatment of Gastrointestinal Ulcers and Complications Associated with Non-steroidal Anti-inflammatory Drugs" (2017)

Diagnosis and Treatment

One day before the operation: Celecoxib Capsules 200mg, taken orally twice a day; Alprazolam Tablets 400mg, taken orally once at night.

Remifentanil Injection, Propofol Fat Emulsion Injection

On the day after the operation: 1. 100mg of Ropivacaine injection for local infiltration around the incision (administered immediately after the operation);

2. 50mg of Flurbiprofen Axetil injection by intravenous route (administered immediately after the operation);

3. Intravenous patient-controlled analgesia device (PCIA):

25mg of Dezocine + 100mg of Flurbiprofen Axetil dissolved in 100ml of normal saline,

Background dose 2ml/h; shock dose 1ml each time, lock time 20 minutes.

4. Ice application to the affected area.

The patient underwent left artificial femoral head replacement, and the pain assessment score was 3 points after the operation. Artificial femoral head replacement is a major orthopedic surgery, which can cause severe pain after surgery. Therefore, **multimodal analgesia** is the first choice for pain treatment.

PCIA

(flurbiprofen axetil + sufentanil) + ropivacaine + ice compress

NSAIDs

mu-opioids receptor

regional infiltration anesthesia
+ nerve block analgesia

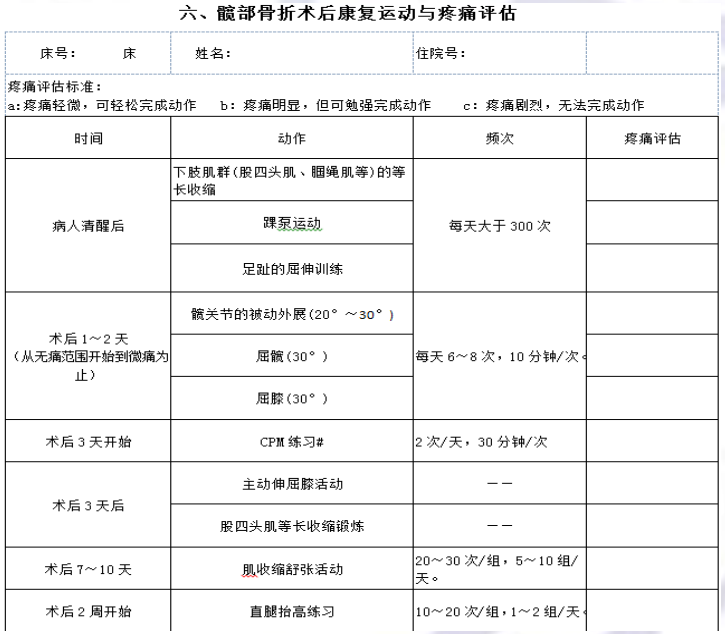
vasoconstriction, reduced congestion and edema

- **The NRS score of patient at rest was 2 points, and at movement it was 3 points the first day after the operation. The pain was not severe and there was no numbness. Biochemical results were normal.**

- **Surgical pharmacists took pharmaceutical care in APS-MDT treatment group.**

Joint Rehabilitation Education

Joint education in Pharmacy and Nursing: The ultimate goal of surgery is to enable patients to resume their normal activities and lives.



六、髋部骨折术后康复运动与疼痛评估

床号：　　床	姓名：	住院号：	

疼痛评估标准：
a:疼痛轻微，可轻松完成动作　b：疼痛明显，但可勉强完成动作　c：疼痛剧烈，无法完成动作

时间	动作	频次	疼痛评估
病人清醒后	下肢肌群(股四头肌、腘绳肌等)的等长收缩	每天大于 300 次	
	踝泵运动		
	足趾的屈伸训练		
术后 1～2 天（从无痛范围开始到微痛为止）	髋关节的被动外展(20°～30°)	每天 6～8 次，10 分钟/次	
	屈髋(30°)		
	屈膝(30°)		
术后 3 天开始	CPM 练习#	2 次/天，30 分钟/次	
术后 3 天后	主动伸屈膝活动	－－	
	股四头肌等长收缩锻炼	－－	
术后 7～10 天	肌收缩舒张活动	20～30 次/组，5～10 组/天。	
术后 2 周开始	直腿抬高练习	10～20 次/组，1～2 组/天	

Standardize the postoperative rehabilitation exercise plan to the second month after surgery

The day after the operation:

Joint ward-round at 9 a.m.: The patient's resting pain on NRS scale was 1 point, with no numbness sensation.
There was no pain when actively flexing the knee and hip to 30 degrees in the supine position, and there was slight pain (NRS scale score of 3) when actively externally rotating the left lower limb to 40 degrees.

After conducting a pharmacological assessment and analysis, the surgical pharmacist concluded that oral analgesics could be substituted.

Discontinue: Parecoxib Injection

Switch to: Celecoxib Capsules 200mg po q12h

Joint Outpatient Clinic of Surgical Pharmacist and Orthopedic Surgeon

The patient will come for follow-up at the joint outpatient clinic one week later.

Pain - Comprehensive Pharmacy Evaluation Results:

1. Take celecoxib capsules on time. Rest pain NRS score is 0, and movement pain NRS score is 2.

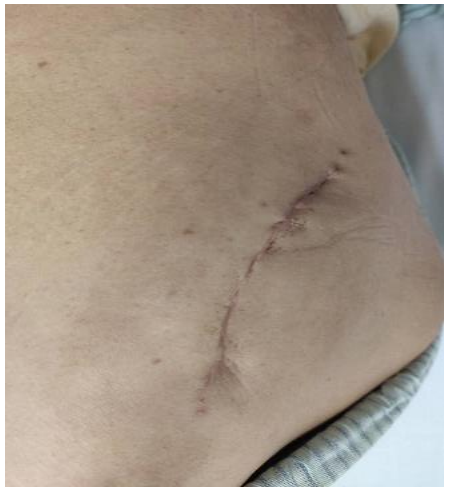
2. The pain is mainly dull, without numbness or distension.

3. The wound healing condition is good, without redness, swelling or pain.

4. Follow the pharmacist's guidance, take amlodipine regularly, and the blood pressure is controlled to normal; take alprazolam tablets on time, and sleep well.

5. The rehabilitation functional training continues, and the assistive device helps to walk a distance of over 500 meters.

Joint Outpatient Clinic of Surgical Pharmacist and Orthopedic Surgeon



Healing of surgical incision

Outpatient Prescription:

1. **Celecoxib Capsules 200mg, orally administered, once daily.**
2. **Alprazolam Tablets 0.3mg, orally administered, once every night.**
3. **Amlodipine Tablets 5mg, orally administered, once daily.**
4. **Rivaroxaban Tablets 10mg, orally administered, once daily.**
5. **Omeprazole Enteric-Coated Capsules 20mg, orally administered, once daily.**

- Pain and peri-operative pain
- Analgesic medication
- A case of Perioperative pain management
- **Summary**

Summary

- Post-operative pain is a significant challenge to the healthcare system, underling the importance of effective peri-operative pain management
- **Multimodal analgesia** is the trend for perioperative pain management
- **The APS-MDT method** has proven to be effective in managing perioperative pain
- Surgical pharmacists play a pivotal role in perioperative pain management by providing patient education, individualized analgesic treatment collaborating with physicians and pharmacological assessments

THANKS!