

Regional Anesthesia

VS

AMBULATORY SURGERY

Prof. Paolo Grossi

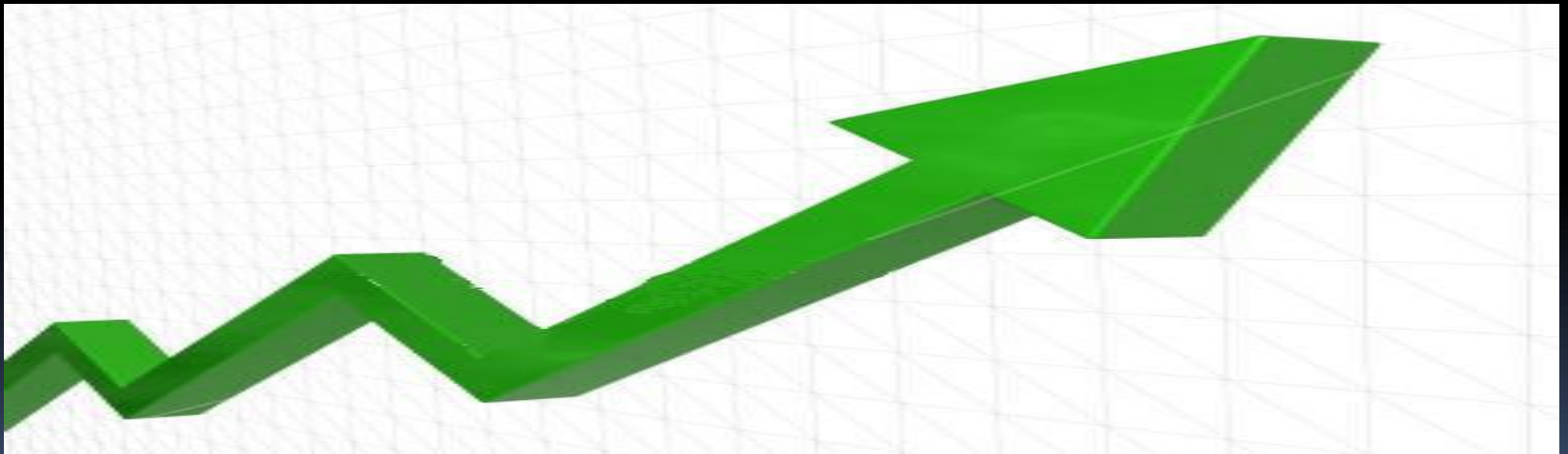
Responsabile Servizio Anestesia
Loco-regionale e Terapia del dolore

IRCCS Policlinico "SAN DONATO"
San Donato Milanese
ESRA Academy Chairman



- last twenty years :
- surgical procedures in Day Surgery grown more

▪ (De Lathouwer C, Poullier JP. How much ambulatory surgery in the World in 1996–1997 and trends? *Ambulatory Surg.* 2000;**8**:191–210.-Lynk WJ, Longley CS. The effect of physician-owned surgicenters on hospital outpatient surgery. *Health Aff.* 2002;**21**:215–221: 10.1377/hlthaff.21.4.215.)



Day Surgery

- Effective
- Cost efficient
- Safe

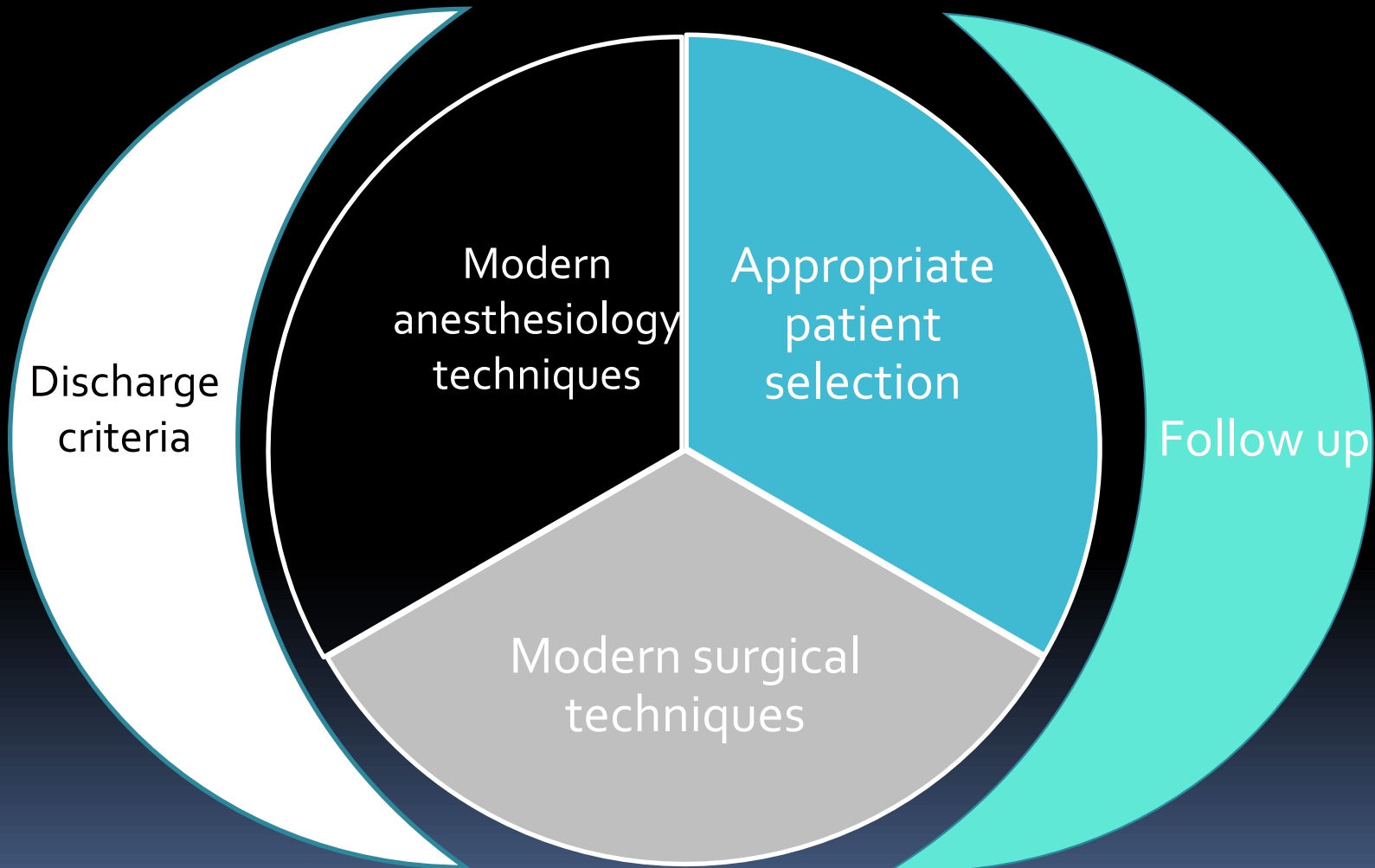


when selection criteria are appropriate

Choice of patient

patients ASA I and II , but also ASA III are suitable

Planning:



Selection criteria

Arbitrary limits

AGE

- No limitations

ASA STATUS

- ASA 1-3 unless there are other complications
- Some ASA 4 (local anesthesia)

Obesity

- No limitations unless there are other coexisting pathologies

Selection criteria

Social factors

- The **carer** should be a responsible adult and a relative, trusted friend or established carer
- Both patient and carer must be able to **understand instructions** provided by healthcare staff
- The carer **must know the circumstances** under which the unit should be **contacted and also know who to contact**
- The patient should be cared for at **home**, which **should ideally be less than 1 hour away from the unit**
- **A telephone** and toilet facilities should be available and easily accessible at the patient's home

Selection
criteria

Medical
conditions
&
comorbidity

OPTIMIZED
CONTROL &
TREATMENT
before surgery

EXERCISE
TOLERANCE

(ability to climb at least one
flight of stairs without any
symptoms)

Excluding or delaying criteria

Absolute cardiovascular contraindications:

- Myocardial infarction within the past 6 months
- Angina causing marked limitation in daily activity
- Congestive cardiac failure
- Symptomatic valvular disease
- Cardiomyopathy
- Tachyarrhythmias
- Second- or third-degree heart block

Hepatic

Any active hepatobiliary disease or compromise

Neurological disease

Patients with neuromuscular disorders, myasthenia gravis, or myotonias are not suitable.

Renal system

Patients undergoing haemodialysis or chronic ambulatory peritoneal dialysis generally are not suitable because of practical difficulties and comorbidity. However, some simple procedures can be undertaken.

Relative cardiovascular contraindications:

- Myocardial infarction more than 6 months previously
- Untreated mild angina
- High blood pressure (systolic >180 mmHg or diastolic > 110 mmHg)
- Cerebrovascular accident in the past 6 months
- Controlled atrial fibrillation
- Previous deep vein thrombosis or pulmonary embolism

Respiratory and airway disease

- Asthma or COPD requiring chronic medication, or with acute exacerbation and progression within past 6 months
- History of major airway surgery or unusual airway anatomy, upper and/or lower airway tumor or obstruction
- History of chronic respiratory distress requiring home ventilatory assistance or monitoring

**Poor control, recent
exacerbation of
symptoms or severe
exercise limitation**

Discharge
criteria



PACU BYPASS
&
EARLY
FACILITATED
DISCHARGE

PACU BYPASS

ALDRETE SCORE

Limitations:

- No valuation of pain, nausea and vomit
- Difficult achievement of minimal score for discharge

MODIFIED ALDRETE SCORE

Limitations:

- Difficult achievement of minimal score for discharge

WAKE SCORE

Wake Score was constructed from the basic 10-point Modified Aldrete Score, not only changing the semantics within several of the scored criteria parameters, but also incorporating 'Zero Tolerance Criteria' that address pain, PONV, shivering, pruritus, and orthostatic symptoms.

Modified Aldrete Score

Wake Score

Physical activity	
Able to move all extremities on command	2
Some weakness in movement of extremities	1
Unable to voluntarily move extremities	0

Differences

Postoperative pain assessment	
None, or mild discomfort	2
Moderate to severe pain controlled with <i>iv</i> analgesics	1
Persistent severe pain	0
Postoperative emetic symptoms	
None, or mild nausea with no active vomiting	2
Transient vomiting or retching	1
Persistent moderate to severe nausea and vomiting	0
Total possible score	14

Wake score

Movement (LE: lower extremity; UE: upper extremity)	Scores:
Purposeful movement of (at least) 1 LE and 1 UE	2
Purposeful movement of at least 1 UE (and neither LE)	1
No purposeful movement	0
Clinical correlations:	
An isobaric spinal would decrease the likelihood of achieving a score of '2' compared with an ipsilateral hyperbaric spinal	
Prolonged emergence time from GA with volatile anesthetic (+/- neuromuscular blocking drugs) would increase the likelihood of achieving a score of '0' as opposed to a '1' or '2'	
Interscalene block patients with blocks designed to provide overnight anesthesia-analgesia would not achieve an Aldrete parameter score of 2, as only 3 of 4 extremities would achieve purposeful movement	

Wake score

Table 2. 'Zero Tolerance Criteria' for WAKE score phase 1 postanesthesia care unit bypass (outpatient surgery) or fast-track phase 1 postanesthesia care unit discharge (inpatient or outpatient surgery)

(1) Pain as appropriately adjusted to patients' baseline pain scores (with movement) at the surgical site

Clinical correlations:

Multimodal analgesia is logically employed on a routine basis, emphasizing nonopioid analgesics such as acetaminophen, Type-2 cyclo-oxygenase inhibitors or nonsteroidal anti-inflammatory drugs, and N-methyl-D-aspartate antagonists (low-dose intravenous ketamine, and/or perioperative oral dextromethorphan, and/or intravenous magnesium)

Preoperative PNBs render patients as more likely to meet this criterion than would postoperative systemic opioids for rescue analgesia

If a patient has a preoperative baseline pain score with movement of 8 out of 10, in the absence of a PNB, it is highly likely that the patient will meet PACU Bypass/discharge criteria on all other parameters and be successfully discharged with a postoperative pain score with movement of 10 out of 10, by the nature of the limited analog scale available to choose from given the high preoperative pain score. However, in the presence of PNBs covering all relevant nerve distributions (e.g., femoral and sciatic for total knee replacement), this would seem much less likely

Buprenorphine added to PNBs will carry likely much greater analgesic duration than would an equivalent systemic dose of morphine or other opioid.

Maintenance anesthesia with propofol avoids the hyperalgesic effects of volatile anesthetics

Spinal/regional anesthesia is likely far less hyperalgesic than is anesthesia with volatile anesthetics and short-acting opioids

(2) PONV as a 'yes-no' assessment

Clinical correlations:

Preoperative oral perphenazine is less sedating than intraoperative prochlorperazine, and is similarly non-sedating as ondansetron and dexamethasone

Systemic clonidine (e.g., as a nerve block adjuvant) may have antiemetic benefits

Volatile anesthetics and systemic opioids are emetogenic

(3) Shivering, pruritus, and/or orthostatic symptoms (lightheadedness and/or hypotension in the sitting position)

Clinical correlations:

Ipsilateral hyperbaric spinal (comprised of a lower overall total intrathecal dose than would an isobaric bilateral spinal) may be less likely to create lightheadedness in the sitting position when compared with isobaric spinal anesthesia, by the time surgery is finished

Systemic clonidine (e.g., added to PNBs) and phenylephrine infusions (commonly coadministered during spinal anesthesia) have favorable antishivering and/or thermoregulatory benefits

Volatile anesthetics disrupt thermoregulation more so than does regional anesthesia

Systemic opioids commonly cause pruritus

Post Anesthetic Discharge Scoring System (PADDS)

ASU Discharge

- Stable vital signs for at least one hour
- Alert and oriented to time, place, and person
- No excessive pain, bleeding, or nausea
- Ability to dress and walk with assistance
- Discharged home with a vested adult who will remain with the patient overnight
- Written and verbal instructions outlining diet, activity, medications, and follow-up appointments provided
- A contact person and circumstances that warrant seeking the assistance of a health care professional clearly outlined
- Voiding before discharge not mandatory, unless specifically noted by physician (ie, urological procedure, rectal surgery, history of urinary retention)
- Tolerating oral fluids not mandatory, unless specified by physician (ie, patient is diabetic, frail, and/or elderly; not able to tolerate an extended period of NPO status)

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Frances Chung, FRCPC,* Vincent W.S. Chan, FRCPC,? Dennis Ong, MD\$

DAY-Surgery

BAD (British Association of Day Surgery) concorded that procedures for ambularoty surgery should:

- be **short** (maximum 2 hours)
- lead to **minimal** physiological **insult**
- not** cause **excessive blood loss** or **fluid shifts**
- not** be associated with **serious postoperative complications**
- involve only **pain** that can be **controlled with oral analgesics**.

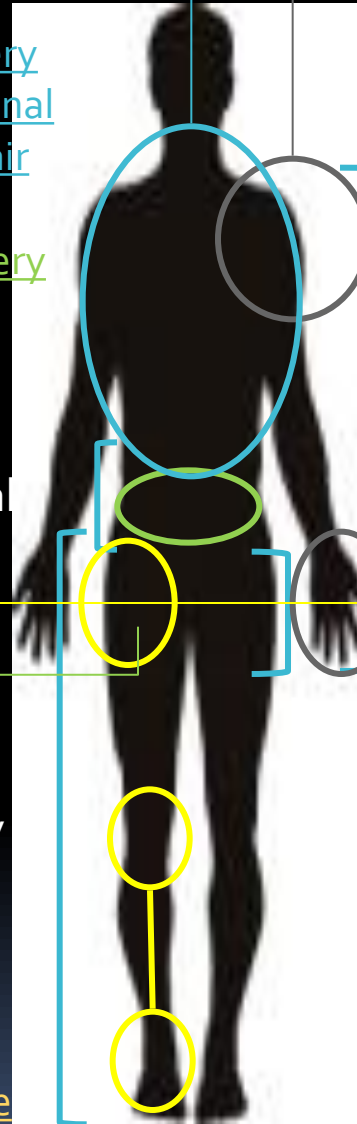
Surgery

Breast surgery
Herniorrhaphy
Abdominal wall surgery
Endovascular abdominal aortic aneurysm repair

Gynecological surgery
Herniorrhaphy
Pediatric patients
Laparoscopic procedures
Low abdominal surgery

Lower extremity surgery

Hip surgery:
Arthroplasty
Arthroscopy
Knee surgery
Lower leg and ankle surgery

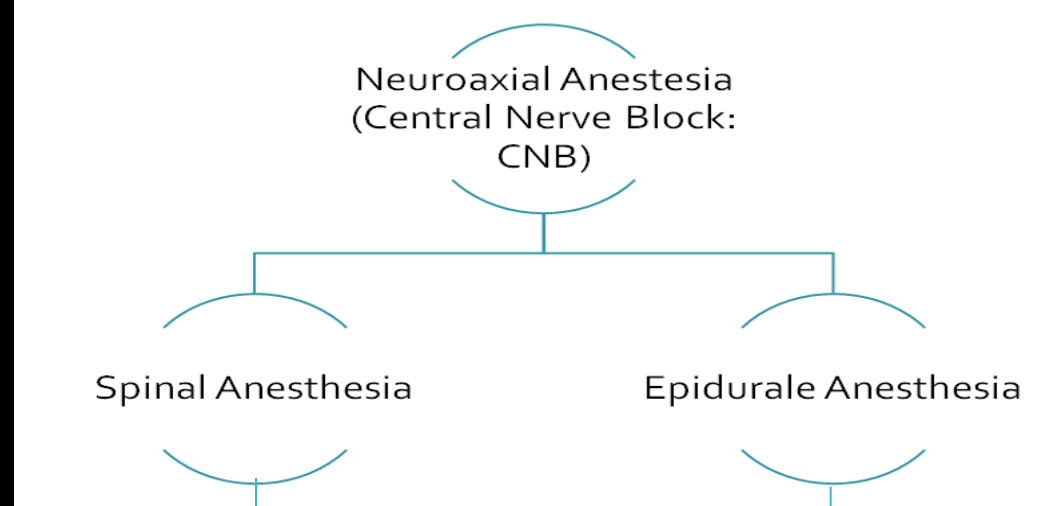


Shoulder surgery:
Hemi- and total arthroplasty
Arthroscopy
Subacromial decompression
Instability of the rotator cuff
Frozen shoulder
Hand surgery

Upper extremity surgery

Lower extremity surgery

Types of RA



Advantage

- Rapid onset
- Minimal expense
- Easy administration
- Better postoperative analgesia

Limitations

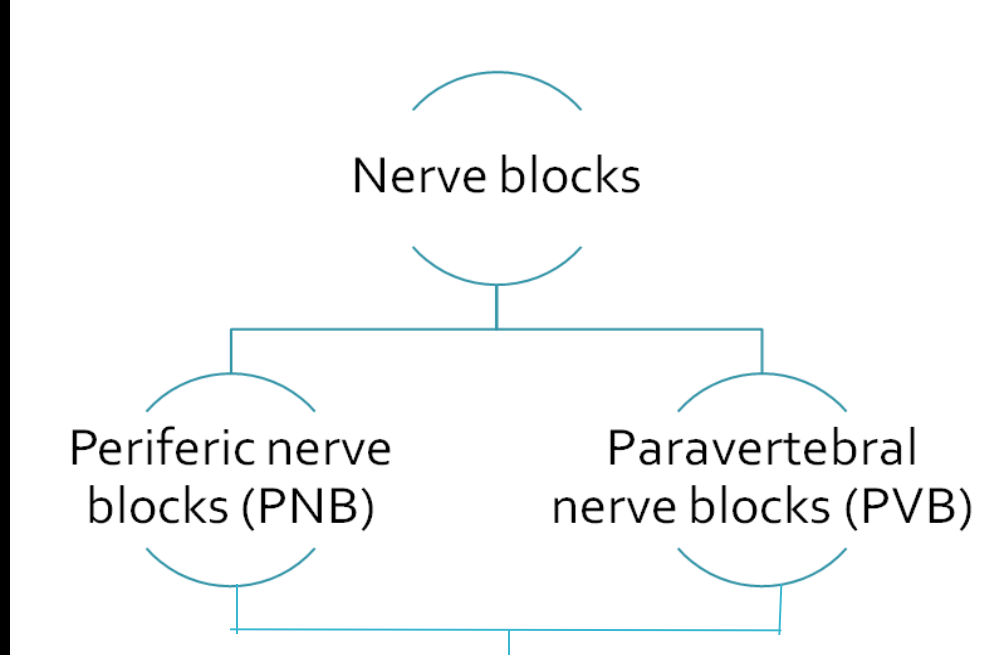
- Transient neurologic symptoms
- Urinary retention
- Prolonged block

Solutions

- Local anesthetic selection:
- Chlorprocaine
 - Ultra-low-doses of bupivacaine
 - Unilateral spinal anesthesia

- Catheter placement
- long lasting postoperative analgesia

Types of RA



Advantages:

- May avoid General Anesthesia
- Better postoperative pain control
- Decreased incidence of PONV
- Less narcotic side effects/ sedation
- Faster discharge readiness

- Single Shot
- Continuous Catheter

-Evolved in ultrasound-guided regional anesthesia (with or without separate nerve stimulation)

Principal PNB

Nerve block technique

- Upper Limb - brachial plexus blocks**
 - Axillary
 - Infraclavicular
 - Supraclavicular
 - Interscalene
- Upper limb peripheral nerve blocks**
 - Radial nerve
 - Median nerve
 - Ulnar nerve
- Lower Limb**
 - Femoral nerve
 - Popliteal Sciatic nerve
 - Saphenous nerve
- Trunk Blocks**
 - Transversus Abdominus Plane

PAJUNK

University Hospitals Birmingham **NHS**
NHS Foundation Trust

ALR

- 1. Avoid use of systemic analgesics
- 2. Minor waste burden
- 3. Adequate analgesia
- 4. Minor alteration of respiratory, hemodynamic metabolic hemostasis
- 5. Avoid intubation

FACTORS INFLUENCING S.A. OUTCOME IN AMBULATORY PATIENTS

- Technique
- Choice of the patient
- Postop management
- Drugs
- Monitoring
- Complications

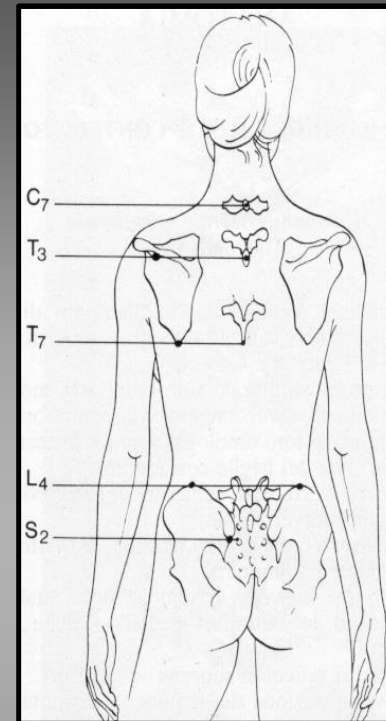
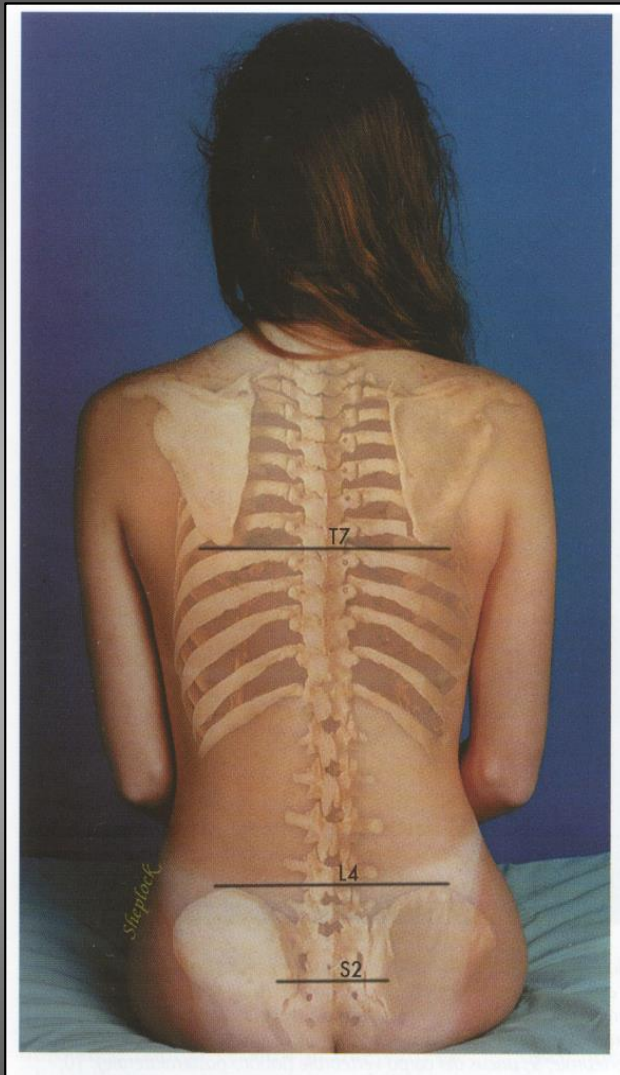


SA technique

- age/ status of the patient
- positioning
- hypotension
- **STERILE FIELD**

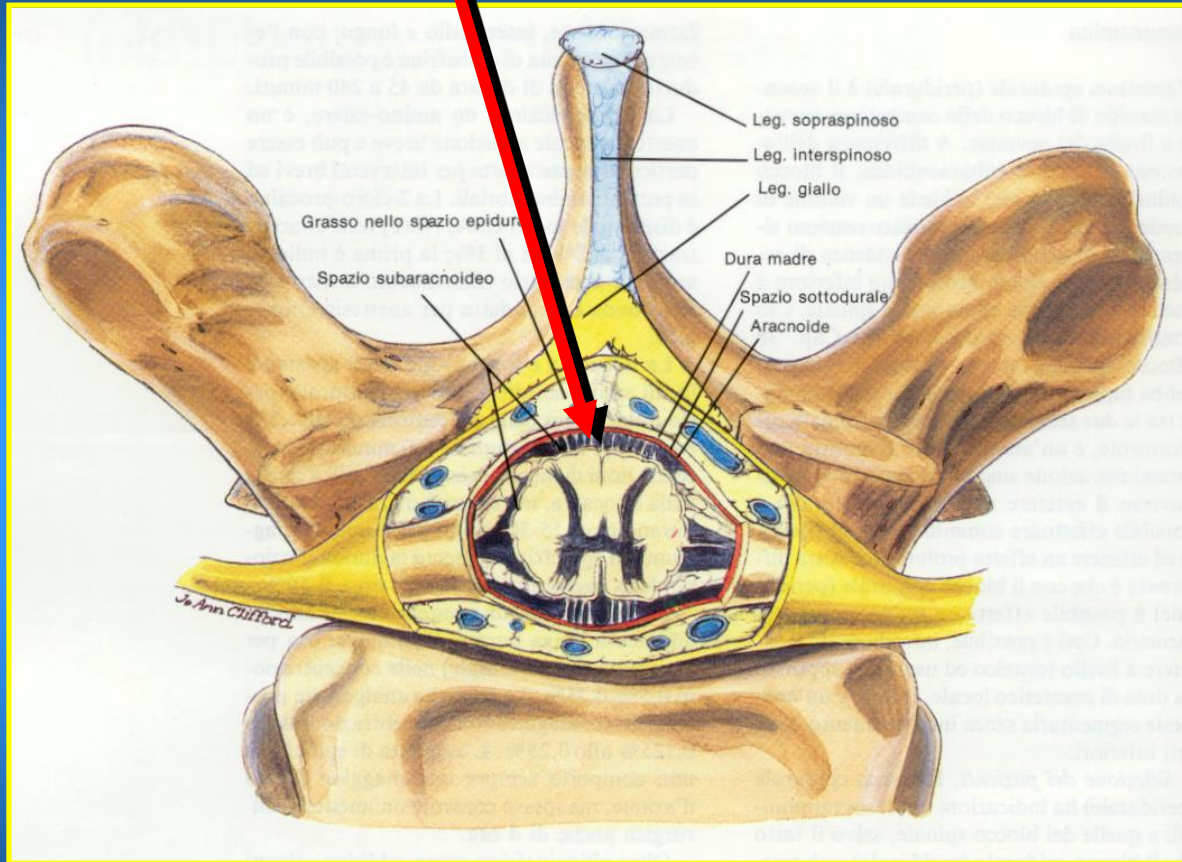


LANDMARKS



C7 sporgente alla base del collo
T3 spina della scapola
T7 apice inferiore della scapola
L4 cresta iliaca
S2 spina iliaca posteriore superiore

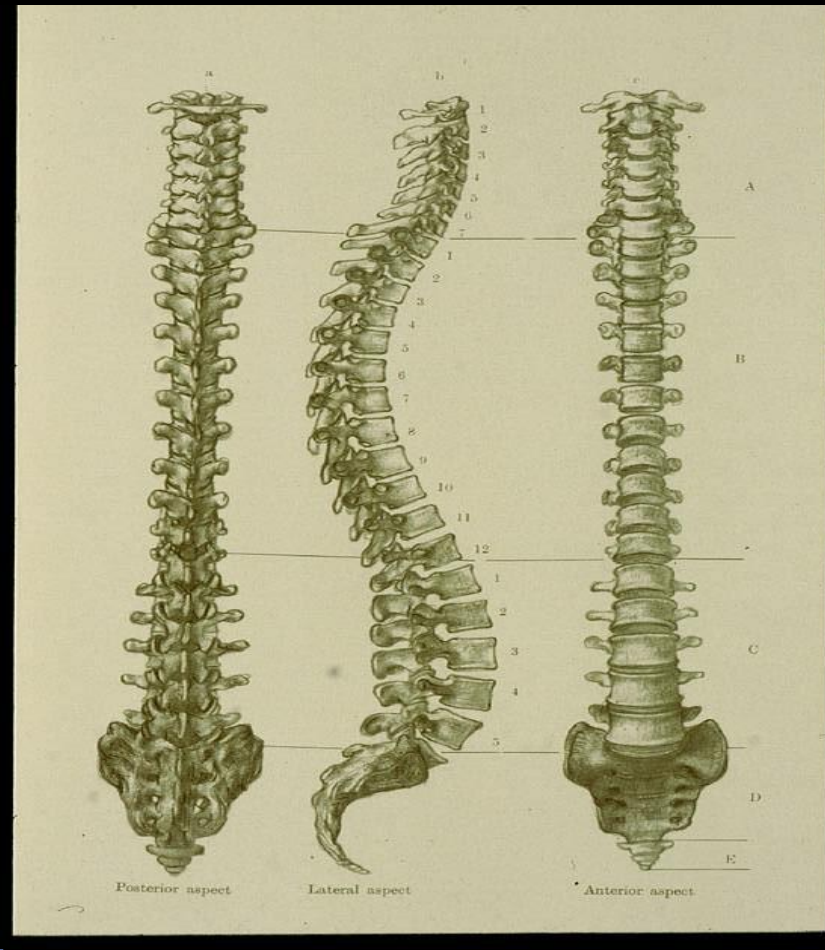
TARGET : SUBARACHNOID SPACE



Ambulatory Spinal anesthesia management is effective when:

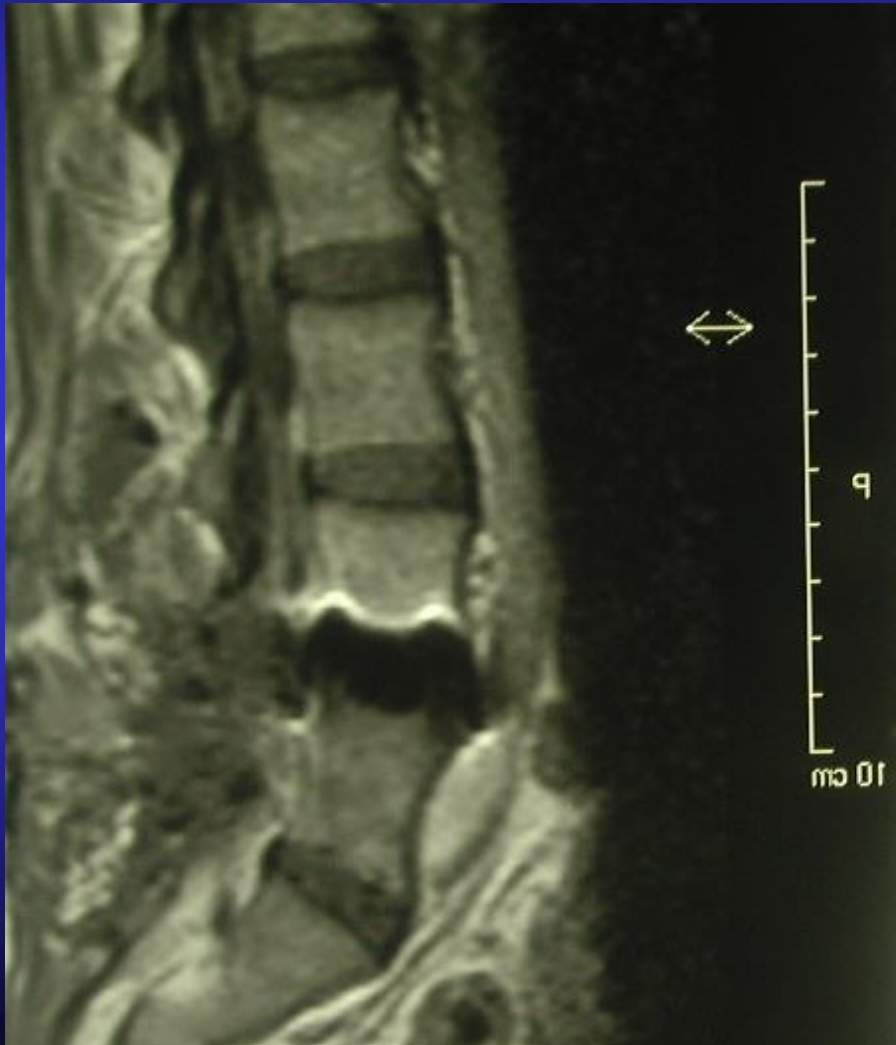
- **DEVICE CHECKINGS**
- **MOTOR-SENSORY DIFFERENTIAL ACTING DRUG**
- **NEUROMONITORING POSTOP**
- **POSTOP PAIN CONTROL BY PCA**
- **HEMODYNAMICS**
- **RESPIRATORY**
- **URINARY - GI**
- **EARLY RECOVERY and close MONITORING**

Technical problems related to primary pathology



- Scoliosis, kyphosis
- Neuromuscular disorders
- Tumors
- Trauma
- Rx, NMR, CAT?

LowBack surgery



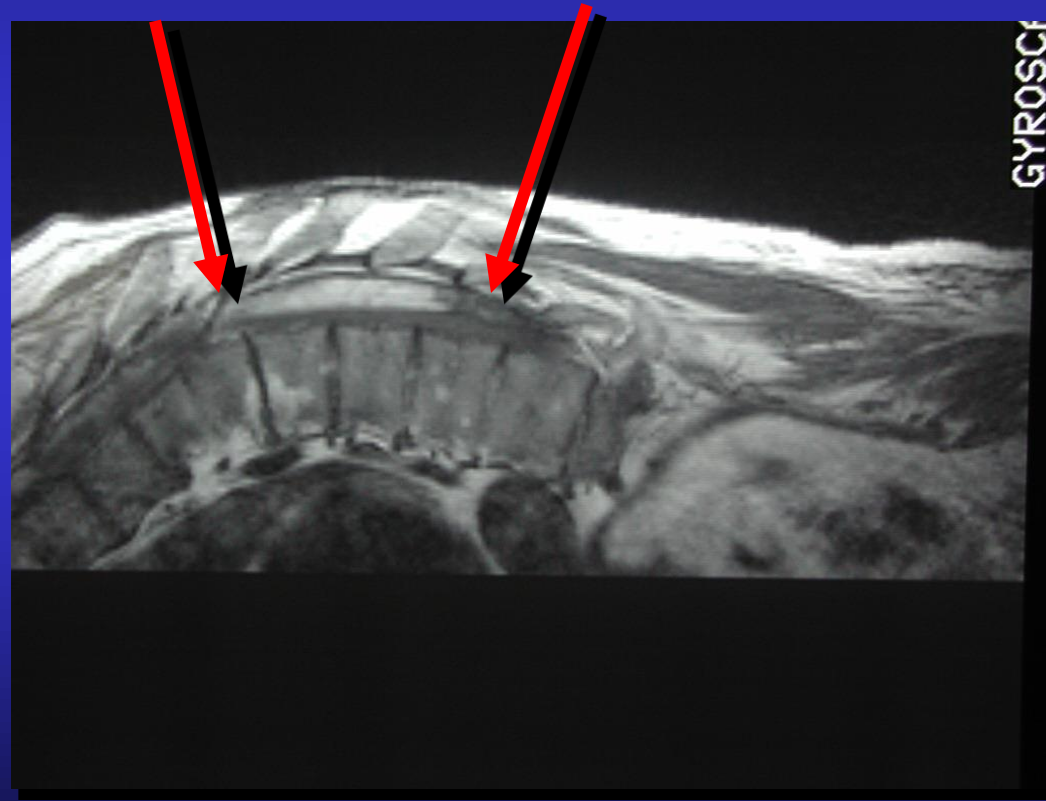
Arthrosis

Side effects-complications

- Technical problems
- Nausea and vomiting
- Urinary retention
- Backache
- Post-dural puncture headache (pdph)
- Transient radicular irritation
- Prolonged or permanent neurologic deficit
- Hemodynamic impairment, hypotension, cardiac arrest
- Epidural hematoma
- Thromboembolic prophylaxis (LMWH) – ASA guidelines

EPIDURAL HEMATOMA: SPINAL REFLEX MONITORING = H reflex

- INFLUENCED BY:
 - Halogenates
 - Hypotermia
 - Hypotension
- hematoma
- ischemia



Prilocaine hydrochloride 2% hyperbaric (Prilotekal®)

- Local Anaesthetic with a similar duration of action to Lidocaine
- New hyperbaric formulation of Prilocaine for use in spinal anaesthesia
- The duration of action is dose-dependent. A dose of 40 to 60mg would be expected to provide extension of sensory blockade required T₁₀ for approximately 100 to 130 minutes. As a general guideline, the maximum recommended dose is 80 mg of Prilocaine hydrochloride.

PRILOCAINE AND HEMODYNAMIC

Secondary amine

Advantages : degradation and toxicity:

- The highest clearance of all the local amino – starch anesthetic drugs.
- Its clearance is twice the lidocaine clearance.
- Higher volume of distribution.
- Plasmatic concentration is lower than lidocaine and mepivacaine concentrations.
- Toxic plasmatic concentrations are rare.
- Maximum dose is twice the lidocaine dose.
- *Intermediate duration, power and fast onset.*

Pharmacodynamic

Mechanism of Action:

Block of the voltage-dependent Na^+ - channels on nerve cell membrane; action on K^+ and Ca^+ - channels.

The block of the channels decreases the impulse propagation in nerve fibers and consequent complete functional block.

Effects on CNS and cardiovascular system

- They are caused by systemic absorption.
- With regard to the cardiovascular system, at *therapeutic* blood concentrations are described changes in cardiac conduction, excitability, refractoriness, contractility, and peripheral vascular resistance.
- At toxic blood concentrations depression of cardiac conduction and myocardial excitability may occur, leading to AV block, ventricular arrhythmias, ACC. The myocardium-depression and the peripheral vasodilation may also lead to a concomitant reduction in cardiac output and hypotension.
- Systemic effects of local anesthetics on the CNS can be irritative and / or depressive. Stimulation effects include restlessness, tremors, chills to seizures. The depressant effects include impairment of consciousness up to coma, cardiorespiratory arrest. Complications of depressive CNS excitatory effects may occur without any precedent, given that the primary neurological effect of local anesthetics is depressive on the spinal cord and the cerebral centers.

Prilo vs lido/mepiva

- the plasma concentration of toxic prilocaine is higher (almost double compared to lidocaine and 50% more than the mepivacaine)
- higher safety level, even in case of erroneously higher dosages (2.3).
- incidence of TNS :
- the greater safety of bupivacaine compared to lidocaine and prilocaine
- in most studies the incidence of TNS was statistically significantly lower when drugs as prilocaine or bupivacaine were used, with a relative risk higher for lidocaine of 5.5 and 6.7 respectively.

Meta-hemoglobinemia

The formation of meta-hemoglobin (MHb) after spinal anesthesia with prilocaine is due to the powerful oxidant action of its metabolites σ -toluidine and nitrous toluidine. The amount of MHb is in relation to the dose of the drug used. After a dose of 300-600 mg can be detected a concentration of about 15% MHb: these levels are considered safe for the general population but can be dangerous for patients with anemia or with compromised cardiopulmonary function (6).



... This dosage is far above the dose used for spinal anesthesia (60-80mg). A study tried to define the risk factors associated with increased formation of MHb and the patients at risk: patients undergoing peripheral nerve block were receiving 400 mg of prilocaine 2% or 300-400 mg of prilocaine 1%. The largest concentrations of MHb were observed in younger patients treated with higher doses. Female gender and high doses in low volumes was significantly associated with MHb (6).

Let's enter in the heart of the matter...

- Prilocaine: relatively new drug, approved in July 2011, but only available in Italy by the end of December 2011.
- The scientific literature concerning prilocaine agrees in affirming its equi-power compared to other medium duration of action local anesthetics. Several studies confirm its greater safety and they highlight its speed during the onset phase and especially during the remission phase of the sensory-motor block, presenting prilocaine as the ideal drug for outpatient procedures or procedures that last no more than 60-90 minutes

What does the literature say?

- ✓ Several clinical studies have been conducted to compare the different local anesthetic drugs used in loco-regional anesthesia.
- ✓ In most of the studies early hemodynamic effects of intrathecal administration of local anesthetics in obstetrics were assessed. The effects described in these case studies, however, can be influenced by the pregnancy paraphysiological conditions, for example: the compression of the inferior vena cava by the fetus with reduction of the venous return from the lower body district and the reduction of cardiac pre-load.
- ✓ Studies in patients undergoing orthopedic surgery and urology evaluate the effectiveness of different drugs, with few data on the hemodynamic changes during anesthesia (measured without the use of invasive monitoring pressure or precise hemodynamic evaluation, anyway)

OUR FINDINGS...

- The aim of our study was to evaluate, in patients undergoing spinal anesthesia with hyperbaric prilocaine 2%, the early hemodynamic stability, defined by a change in heart rate less than 10% and maintenance of Cardiac Index 2.5-4 L / min / kg .
- Hemodynamic stability defined by the absence of:
 - - Reduction of baseline blood pressure less than 30%
 - - A change in heart rate less than 10%
 - - Cardiac Index in the normal range 2.5-4 L / min / kg
- Stroke Volume Variation $\leq 15\%$.
- At the same time: the effectiveness of the anesthetic block and the block level reached by the drug (BROMAGE scale).

MATERIALS

- Vigileo / FloTrac in patients undergoing spinal anesthesia with prilocaine.
- 20 evaluated patients undergoing major orthopedic surgery of the lower limbs.
- Primary end points:
 - assessment of hemodynamic stability through invasive monitoring of BP, IC, SVV
 - Standard monitoring of heart rate (HR) and peripheral oxygen saturation (O₂ saturation).
- Secondary end points:
 - effectiveness of anesthesia
 - level reached
 - ONSET speed (measured as sensory block, lack of response to pin-prick test at a level T₁₂).

Monitored hemodynamic parameters

- Blood Pressure (BP) invasive via radial artery catheter
- Cardiac Index (CI) via FloTrac / Vigileo;
- Stroke Volume Variation (SVV) via FloTrac / Vigileo;
- Heart rate (HR) by ECG.
- For the evaluation of the secondary end point, dermatomal level of analgesia achieved, we used the *pin-prick test* to determine the level of cutaneous anesthesia.

RESULTS

HEART RATE

The heart rate has been stable during the study period, with a statistically significant data at time 3 ($p = 0.03$) (Figure 2). The maximum variation in the HR was 6% at T_3 , in line with the data reported in the literature.

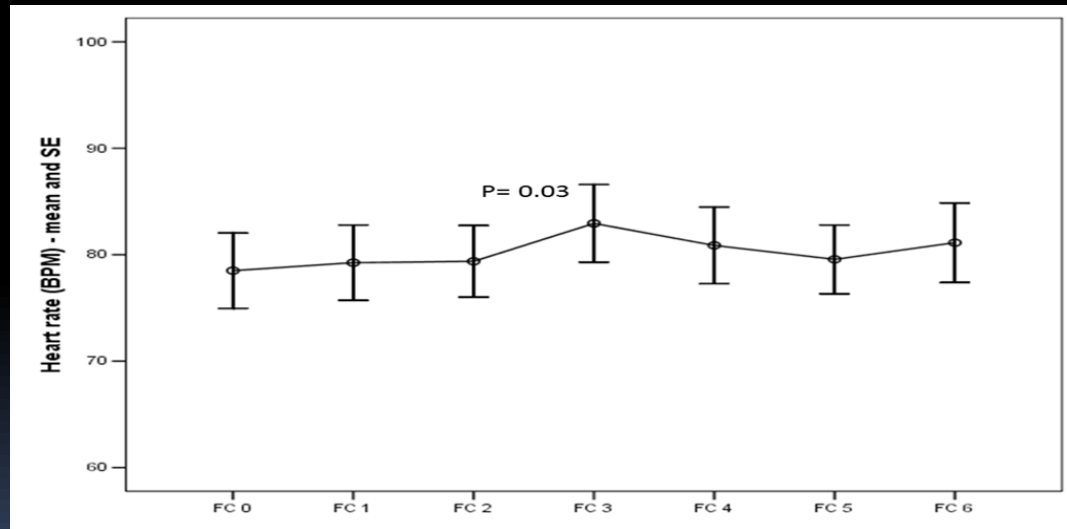


Fig. 2: Heart rate over time

BLOOD PRESSURE

It was possible to detect a statistical significance in the values of SBP between times 0 and 1 (between basal and 2 minutes after the anesthesia) with a $p = 0.011$, and between times 1 and 2 (so between 2 and 4 min after the execution of anesthesia) with a $p = 0.044$ (figure 3).

The maximum percentage variation from baseline has occurred at T6, 12 minutes after the spinal anesthesia, with a variation of 23%. This value remained within the start parameters of our study which defined a reduction of pressure as clinically significant if more than 30% compared to baseline.

Medium blood pressure and diastolic blood pressure did not provide statistically significant values.

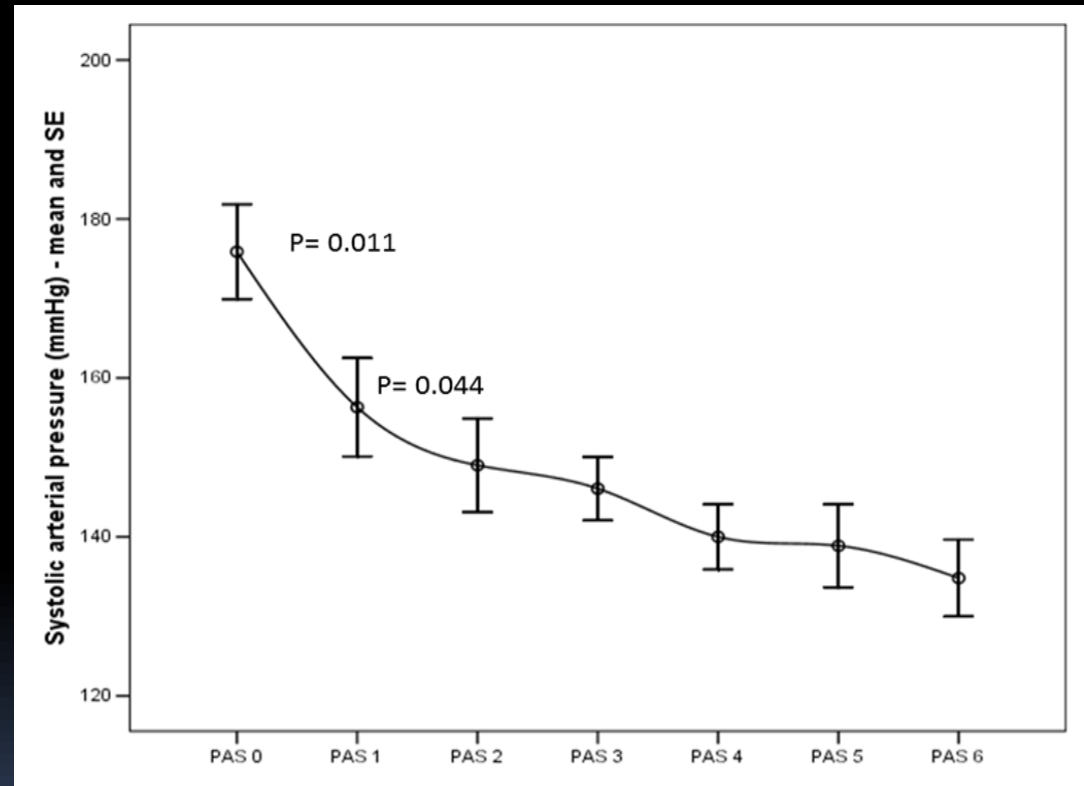
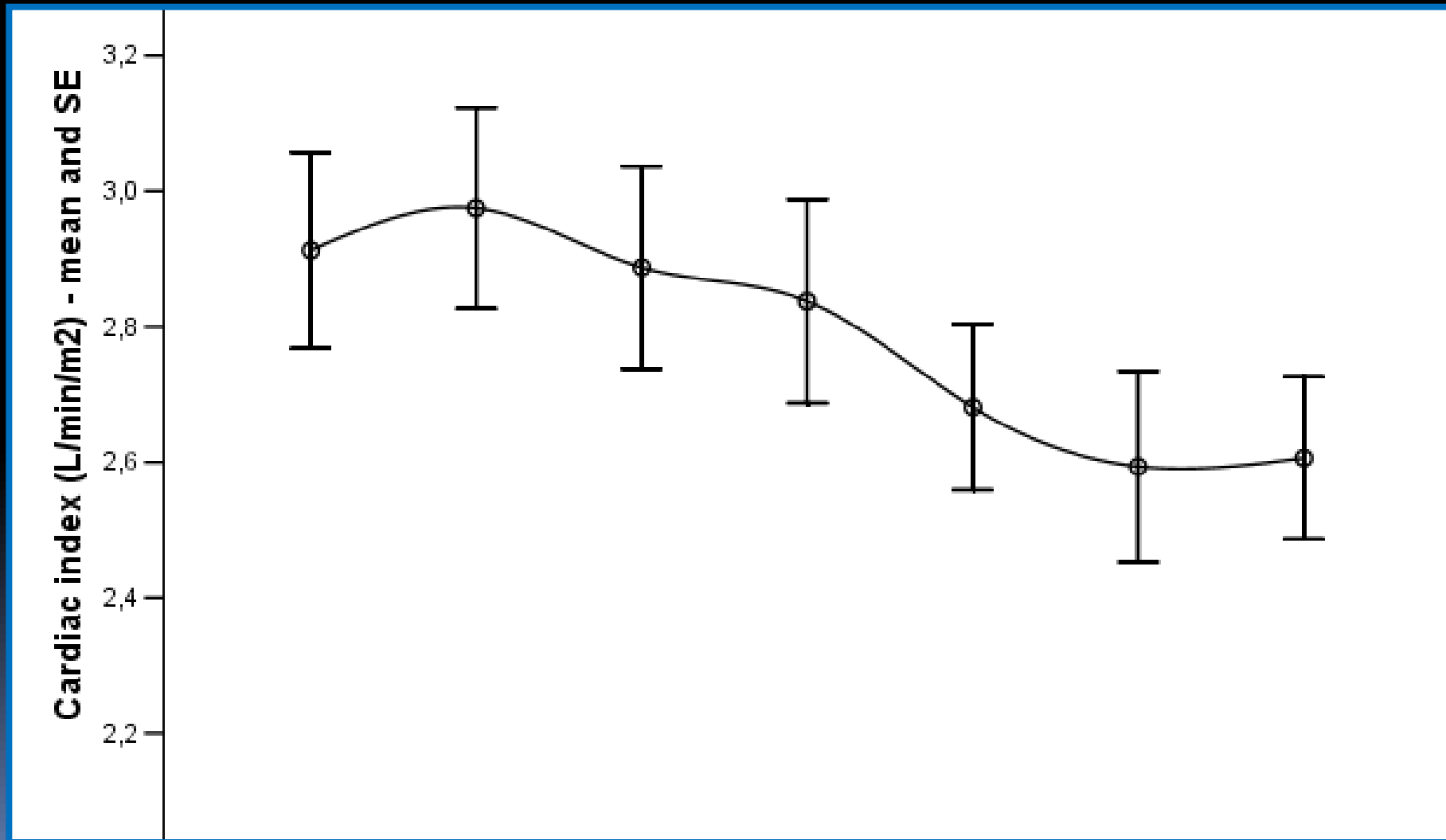


Fig.3: SBP → average vs. time.

Fig.4: Changes in Cardiac Index over time.



STROKE VOLUME VARIATION

In the analysis of data related to stroke volume variation (SVV) has been shown a statistically significant value at time 2 (4 minutes after the anesthesia) compared to baseline ($p = 0.034$). The maximum percentage variation was detected in this very measurement with a 23% increase from baseline.

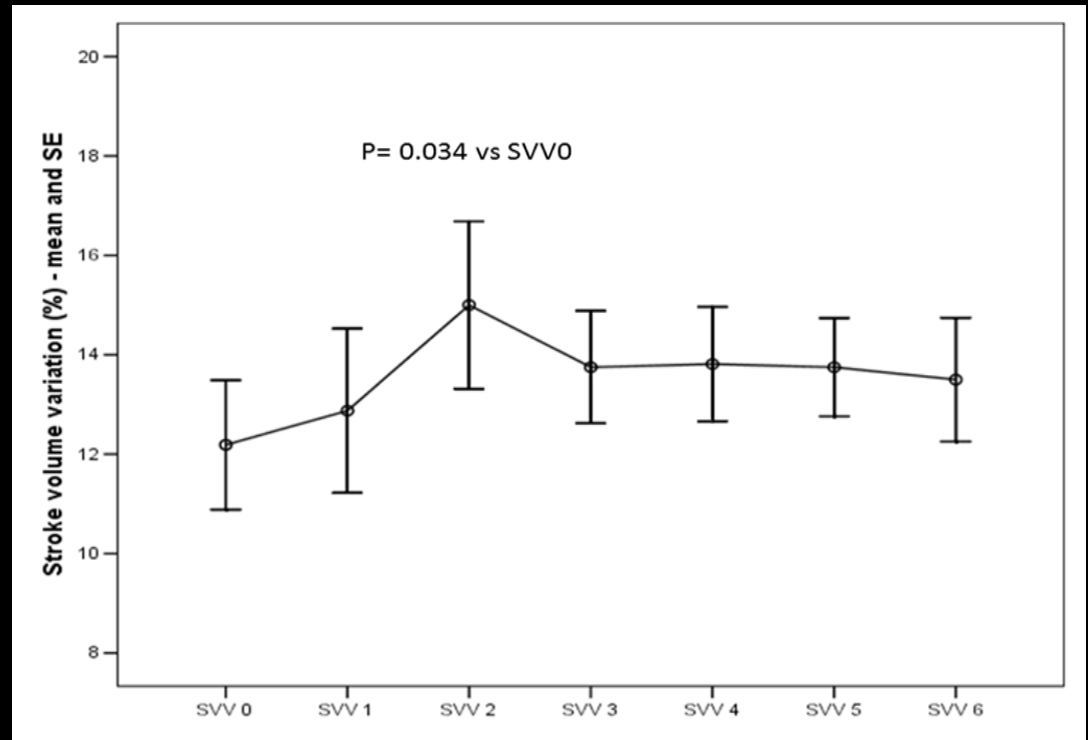


Fig.5 Variation SVV with over time

STROKE VOLUME

Concerning with the stroke volume (which we have maintained indexed for body weight) a data is found at the limits of statistical significance at time 6, with a $p = 0.055$ (Figure 6).

In correspondence of this data we have also the maximum percentage variation with a reduction of the SV by almost 15%.

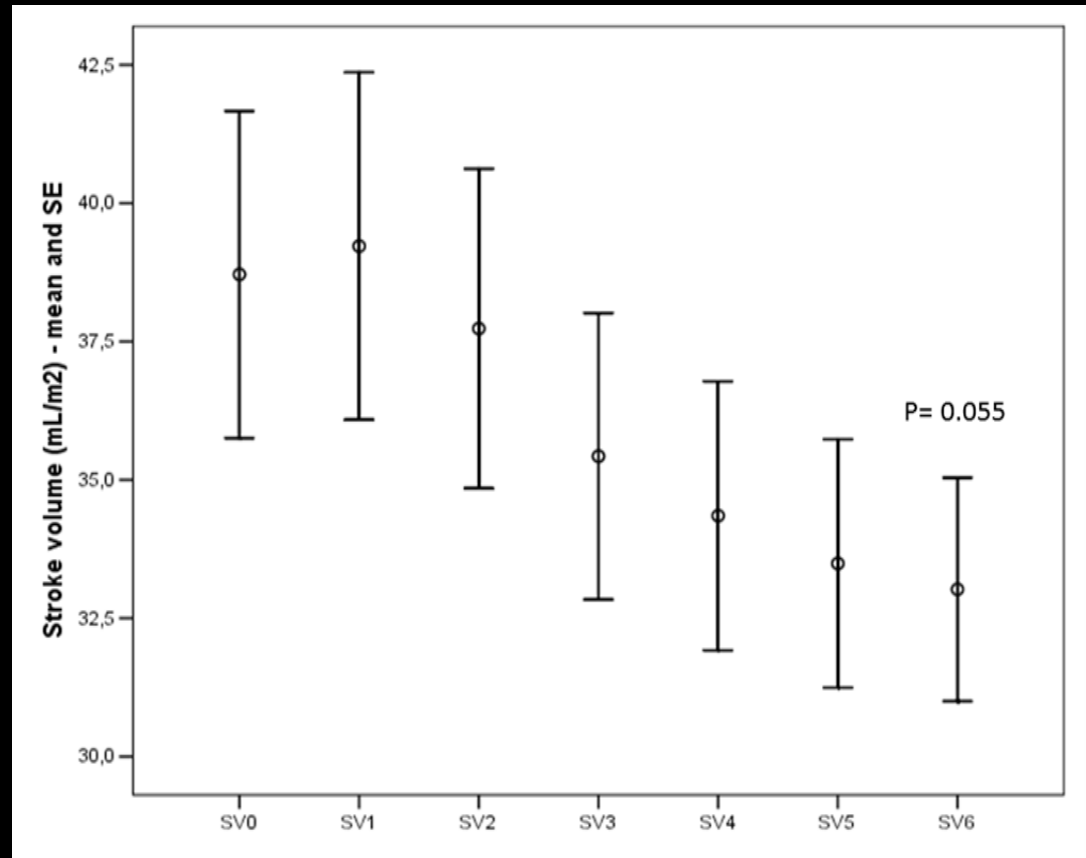


Fig.6:Variation of Cardiac Output over time

MOTOR AND SENSITIVE BLOCK

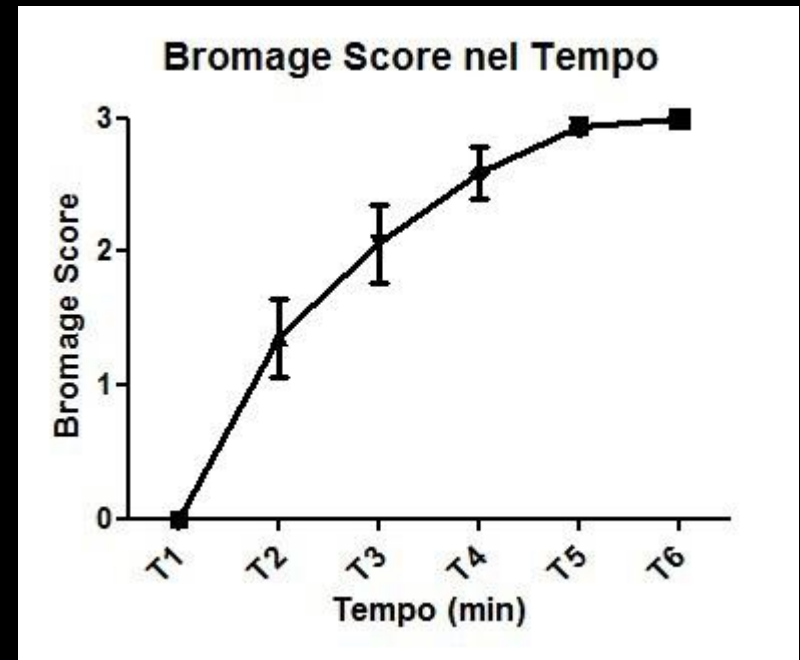
The secondary end-point:

the speed of a complete motor block (Bromage score 3): > 50% of patients had a Bromage score of 2 at time 3 already, and over 75% at time 4. At time 5 99% of patients had a complete motor block.

Pin Prick test:

At T₄ only 4 /17 patients had not reached that level yet; at T₅ 100% of patients had already achieved an effective level of anesthesia and analgesia.

If we look at the average level reached to every survey we see that already in T₄ patients achieved an optimal level of analgesia and anesthesia



Sensitive block:

Pin Prick test level T₁₂

- T₄ = only 4/17 patients had not reached that level yet

- T₅ = 100% of patients had achieved a degree of effective anesthesia and analgesia.

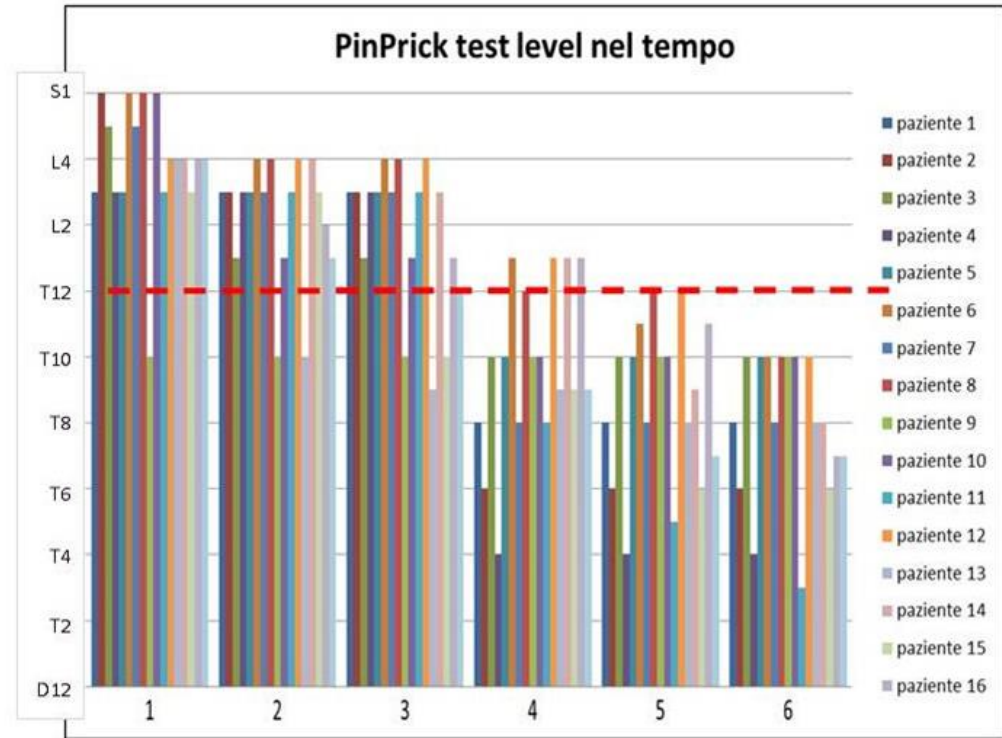


Figura 11. Andamento del blocco sensitivo nel tempo.

Fig.7 Performance of sensory block in time

CONCLUSIONS

- ❑ The data collected show that prilocaine is a drug highly effective and extremely safe.
- ❑ Its safety from the hemodynamic point of view is shown by the values of the parameters that have never fallen below the level of security (both in absolute and percentage terms), showing a good stability of HR, SBP, SV and SVV. One interesting fact comes from the association between level of the block and reduction in blood pressure, regardless of the time.
- ❑ The effectiveness of prilocaine has been demonstrated by the fact that all patients studied have reached the complete motor block, and the majority of them in a time less than 10 '.
- ❑ The level of the sensory block achieved was more than satisfactory, reaching in all patients the level of T₁₂ in less than 10 'and the level T₁₀ and over in maximum 12'.

CONCLUSIONS

- safe and effective use of prilocaine
- confirmation of performance characteristics
- Scarce, never clinical hemodynamic impact.

References

1. Slagt C, Beute J, Hoeksema M, Malagon I, Mudler JW, Groeneveld JA. *Cardiac Output derived from arteria pressure waveform analysis without calibration vs. termodilution in septic shock: evolving accuracy of software versions.* Eur J Anesthesiol. 2010 Jun;27(6):550-4.
2. Concepcion M, Covino BM. *Rational use of local anesthetics.* Drugs 1984; 27: 256-270.
3. Mather L, Cousins MJ. *Local Anaesthetics and their current clinical use.* Drugs 1979; 18: 185-205.
4. Martínez-Bourio R, Arzuaga M, Quintana JM, Aguilera L, Aguirre J, Saez-Eguilaz, Arizaga A. *Incidence of transient neurologic symptoms after hyperbaric subarachnoid anesthesia with 5% lidocaine and 5% prilocaine.* Anesthesiology 1998; 88: 624-628.
5. Liu SS. *Current issues in spinal anesthesia.* Can J Anesth 2002; 49: R1-R5.
6. Vasters FG, Eberhart LHJ, Koch T, Kranke P, Wulf H, Morin AM. *Risk factors for prilocaine-induced methaemoglobinemia following peripheral regional anaesthesia.* Eur J Anaesth 2006; 23: 760-765.
7. Burm AGL. *Clinical pharmacokinetics of epidural and spinal anesthesia.* Clin Pharmacokin 1989; 16: 283-311.
8. Fisher A, Bryce-Smith R. *Spinal analgesic agents. A comparison of cinchocaine, lignocaine and prilocaine.* Anaesthesia 1971; 26: 324-329.

9. Covino BG, Giddon DB. *Pharmacology of local anesthetic agents*. J Dent Res 1981; 60: 1454-1459.
10. Camponovo C. *Prilocain 2% hyperbar, intrathecal - Clinical experience in Switzerland Sintetica: Internal file Report 04.12.2007*.
11. Camponovo C. *Ultrashort local anesthetics: Spinal Hyperbaric Prilocaine*. Perimed 2/2008; 26-32.
12. *Prilocaina iperbarica aumenta l'affidabilità, la tollerabilità e l'efficacia dell'anestesia spinale per la chirurgia ambulatoriale*. Atti del Simposio HAI dell'Associazione Tedesca di Anestesiologia e Terapia Intensiva (DGAI). Berlino 9/2010; 47-51.
13. Zoremba M, Hinnerk W. *Anestesia spinale in regime ambulatoriale. Nuove tendenze per una tecnica antica*. Perimed 2010; 1-8.
14. Camponovo C, Fanelli A, Ghisi D, Cristina D, Fanelli G. *A prospective, prospective, double-blinded, randomized, clinical trial comparing the efficacy of 40 mg and 60 mg hyperbaric 2% prilocaine versus 60 mg plain prilocaine for intathecal anesthesia in ambulatory surgery*. Anesth Analg. 2010 Aug;111(2):568-72.
15. Langesæter E, Dyer RA. *Maternal haemodynamic changes during spinal anaesthesia for caesarean section*. Curr Opin Anaesthesiol. 2011 Jun;24(3):242-8.
16. Auler JO Jr, Torres ML, Cardoso MM, Tebaldi TC, Schmidt AP, Kondo MM, Zugaib M. *Clinical evaluation of the flotrac/Vigileo system for continuous cardiac output monitoring in patients undergoing regional anesthesia for elective cesarean section: a pilot study*. Clinics (Sao Paulo). 2010 Jun;65(8):793-8.

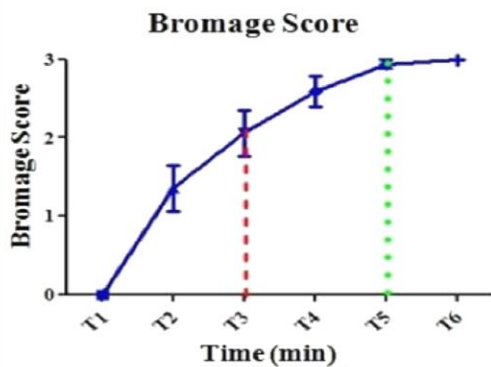
Hemodynamic effects of subdural 2% Prilocaine

Background and Aims

Hyperbaric 2% Prilocaine is a medium acting local anesthetic for spinal use. The aim of our study was to investigate hemodynamic effects of this local anesthetic recording invasive measurements of hemodynamic variables: arterial pressure, cardiac index, stroke volume variation, cardiac frequency. Meanwhile we evaluated its efficacy on sensory and motor block and speed onset.

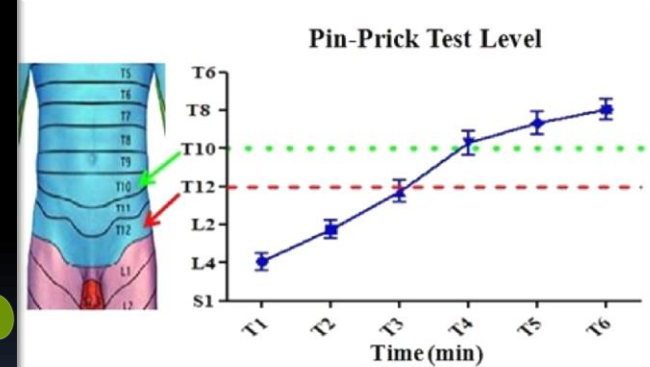
Methods

Ethical committee approval obtained (January 21, 2012, Ethical Committee of ASL Milano 2). All patients received an arterial catheter placement in radial artery and were connected to Vigilio/FloTrack system: basal parameters were recorded 5 minutes before anesthesia. After combined spinal-epidural anesthesia and subdural administration of the drug, hemodynamic parameters were recorded every 2 minutes, as well as level of sensory and motor block, for the first 12 minutes (total of 7 points of measurements).



Results

No clinically significant hemodynamic events were recorded. At 10 minutes Bromage 3 score was obtained in all patients, in 8 minutes skin analgesia level of T10 was reached by all patients.



Conclusion

Prilocaine has demonstrated an optimal hemodynamic stability with no clinically significant hemodynamic effects recorded and good anesthetic efficacy, with fast and efficient sensory and motor block.

Bibliography:

- Camponovo C. Anesth Analg. 2010 Aug;111(2):568-72.
- Mayer J. J Cardiothorac Vasc Anesth. 2009 Jun; 23(3): 401-6.

Authors:

Botticelli MM, Somenzi A, Matteazzi A, Cavalleri G, Grossi P.

A Comparison of Regional Versus General Anesthesia for Ambulatory Anesthesia: A Meta-Analysis of Randomized Controlled Trials

Spencer S. Liu, MD*, Wyndam M. Strodbeck, MD*, Jeffrey M. Richman, MD†, Christopher L. Wu, MD†

Departments of Anesthesiology, *Virginia Mason Medical Center and the University of Washington, Seattle, Washington; †Department of Anesthesiology and Critical Care Medicine, The Johns Hopkins University, Baltimore, Maryland

Is it
effective?

Despite RA presents **numerouse potential advantages** over GA
(CNB: ↓ VAS score, ↓ need of postanesthetic analgesia; PNB: PACU
↑ bypass, VAS ↓ score, need ↓ of postanesthetic analgesia, incidence
↓ of nausea, shorter PACU time, patient satisfaction)

None traslates into shortened ASU
(ambulatory surgery unit) time.

CONCLUSION

We know RA is better.....but only...



...All the others have to present data.....