

TRANSVERSUS ABDOMINIS PLANE (TAP) BLOCK

Martin Cervenka

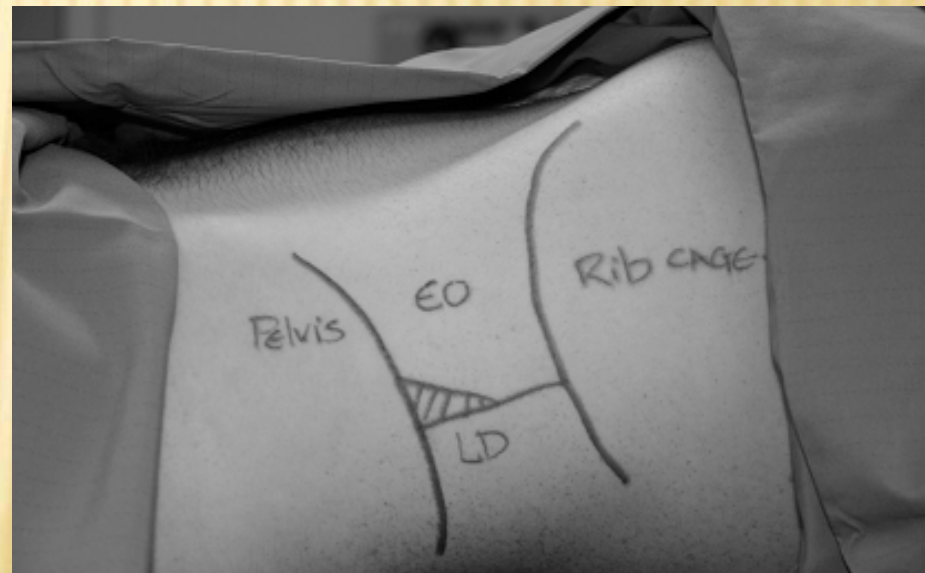
HISTORIE

- ✘ Poprvé popsán jako landmark technika v roce 2001
- ✘ Rafi AN. *Abdominal field block: a new approach via the lumbar triangle. Anaesthesia* 2001, 56(10): 1024
- ✘ Technika podrobněji zpracována v Galway 2007
- ✘ McDonnell JG, O´Donnell, Curley G, et al. *The analgesic efficacy of transversus abdominis plane block after abdominal surgery: a prospective randomized controlled trial. Anesth Analg* 2007, 104(1): 193
- ✘ McDonnell JG, O´Donnell, Curley G, et al. *The analgesic efficacy of transversus abdominis plane block after cesarean delivery: a prospective randomized controlled trial. Anesth Analg* 2008, 106(1): 186.
- ✘ V dalších letech následovaly modifikace a ultrazvukově naváděné techniky
- ✘ Hebbard P, Fujiwara Y, Shibata Y, et al. *Ultrasound guided transversus abdominis plane (TAP) block. Anaest Intensive Care* 2007, 35(4):616.

TECHNIKA PROVEDENÍ

- ✘ Trigonum Petit
- ✘ *m.latissimus dorsi*, *m.obl. abdominis externus*, *crista iliaca*
- ✘ Jehla kolmo k povrchu
- ✘ Volba jehly

- ✘ Dva po sobě následující „klik“ fenomény:
 - ✘ 1. klik = průnik jehly vnější fascií/aponeurosou *m.obl.externus*
 - ✘ 2. klik = průnik jehly do prostoru mezi *m.obl.int.* a *m.trans. abdominis*
- ✘ Po negativní aspiraci aplikace 20-30 ml LA
- ✘ Objem × max. dávka LA



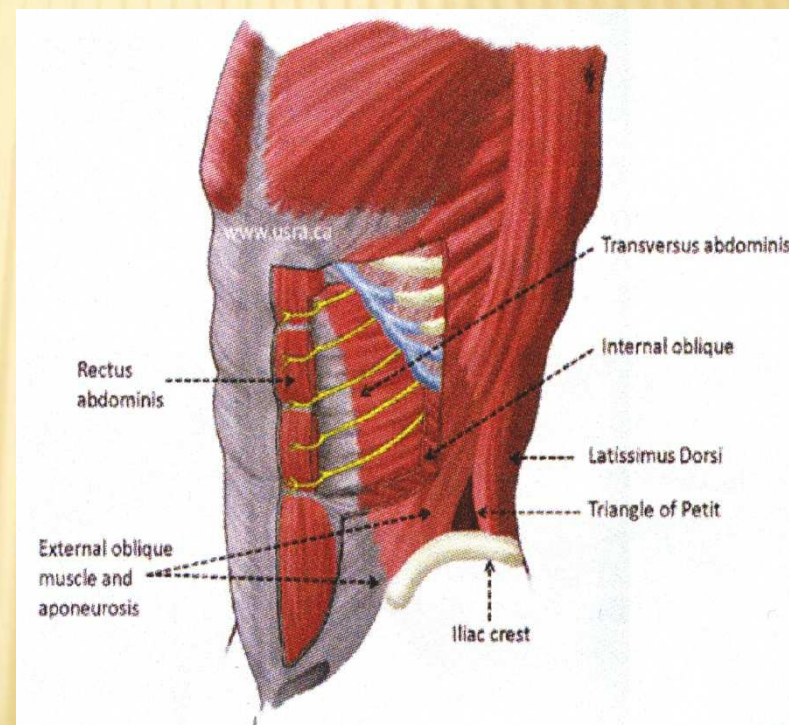
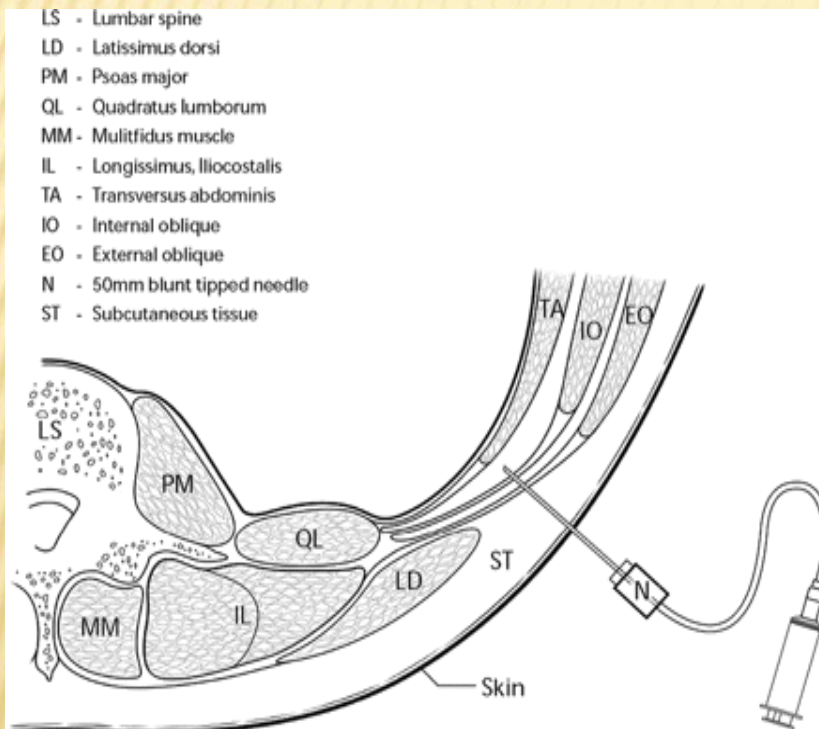
TECHNIKA PROVEDENÍ



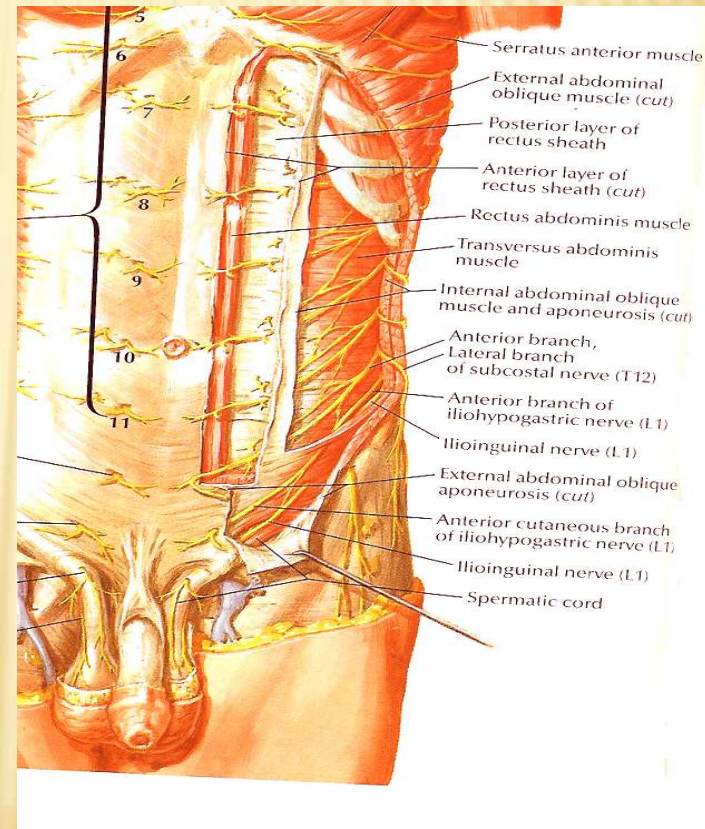
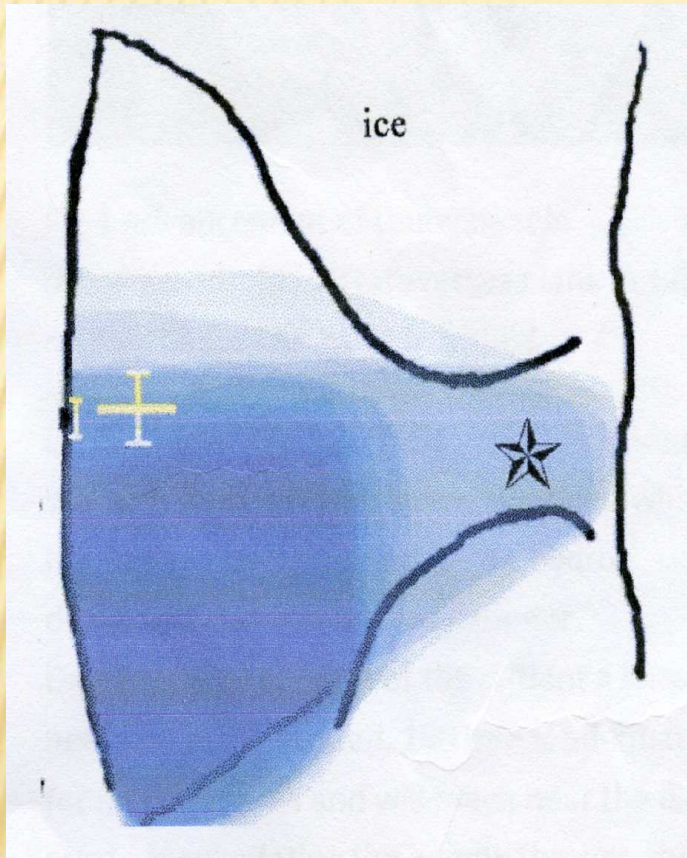
ANATOMIE A INERVACE BŘIŠNÍ STĚNY

- ✘ Stěna břišní : inervační oblast segmentů Th6 až L1
- ✘ Stěna tvořena 3 svalovými vrstvami
 - ✘ *M. obliquus externus abdominis*
 - ✘ *M. obliquus internus abdominis*
 - ✘ *M. transversus abdominis*
- ✘ Periferní nervy odpovědné za inervaci přední břišní stěny probíhají ve vrstvě mezi m.obl.int. a m.transversus abdominis v tzv. TAP
- ✘ V segmentální oblasti Th6 až Th9 pronikají nervy do TAP ventrálně od přední axilární čáry, od urovně Th9 do L1 naopak dorsálněji do TAP
- ✘ výrazné nervové anastomózy (zejména v oblasti Th9 až L1)

ANATOMIE A INERVACE



DOSAŽENÁ ANALGEZIE



ŠÍŘENÍ ANESTETIKA



EVIDENCE BASE



- ✘ “The analgesic efficacy of Transversus Abdominis Plane Block After Abdominal Surgery: A Prospective Randomized Controlled Trial”
McDonnell et al. Anesthesia & Analgesia. 2007
- ✘ Prospective, randomized, double-blind, clinical trial.
- ✘ 32 pts scheduled for large bowel resection via a midline incision.
- ✘ All pts received ‘a standard postoperative analgesic regimen’, consisting of paracetamol, diclofenac and PCA.
- ✘ Pain, nausea & sedation scores measured at 2, 4, 6 & 24hrs.

RESULTS



- ✘ Pts undergoing TAP block
 - + had a longer time to first request for morphine
 - + reduced overall morphine requirements
- ✘ Postoperative pain scores were reduced at all time points assessed, both at rest and on movement.
- ✘ Sedation scores were reduced at 4 & 6hrs.
- ✘ Incidence of PONV was substantially reduced.

POSTOPERATIVE PAIN SCORES & ANALGESIC REQUIREMENTS



Table 2. Postoperative Pain Scores and Analgesic Requirement

	Control (n = 16)	TAP block (n = 16)
Time to first request for morphine (min)	24.1 ± 6.9	157.2 ± 27.9‡
Mean 24 h morphine requirement (mg)	80.44 ± 4.8	21.94 ± 2.2†
Categorical pain severity		
PACU	2.5 (2, 3)	0 (0, 1)‡
2 Hours	2 (2, 2)	0 (0, 1)‡
4 h	2 (1.5, 2)	0 (0, 1)‡
6 h	2 (1, 2)	1 (0, 1)‡
24 h	1 (1, 2)	1 (0, 1)

Ordinal data are presented as medians and interquartile ranges (given in parentheses), and continuous variables are presented as mean ± SEM.

TAP = transverses abdominis plane; PACU = postoperative anesthesia care unit.

† P ≤ 0.01; and ‡ P ≤ 0.001 when controlled with control.

VAS AT REST

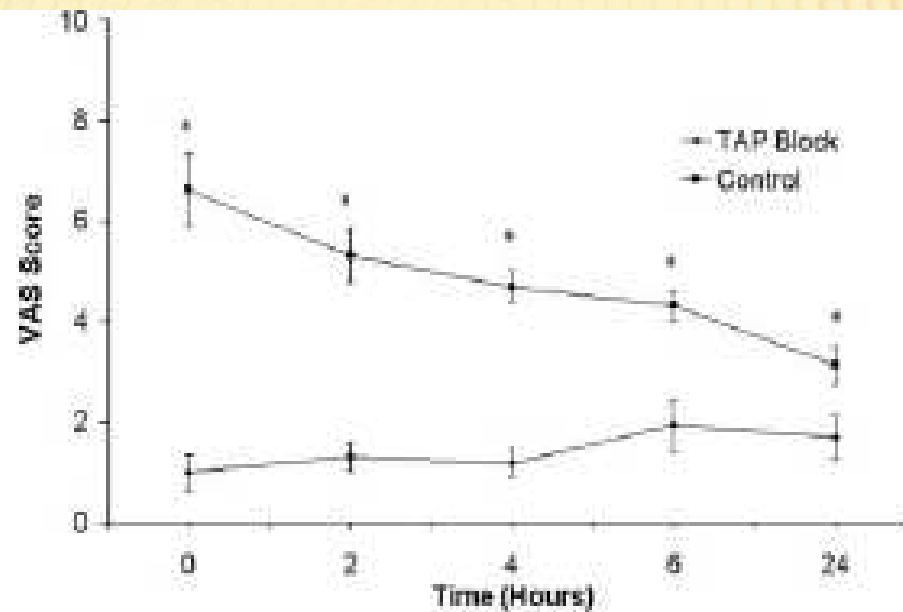


Figure 3. Mean postoperative verbal analog scale (VAS) pain scores at rest in each group over the first 24 postoperative hours. *Indicates significantly ($P < 0.05$, *t*-test after ANOVA) higher VAS score when compared with the transversus abdominis plane (TAP) block group.

VAS ON MOVEMENT

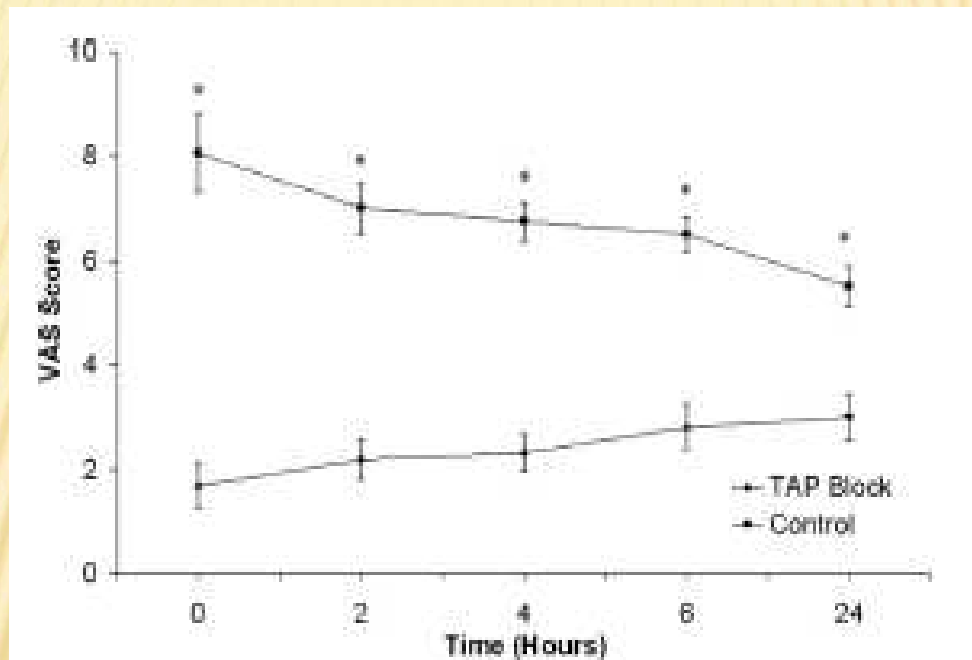


Figure 4. Mean postoperative verbal analog scale (VAS) pain scores on movement in each group over the first 24 postoperative hours. *Indicates significantly ($P < 0.05$, *t*-test after ANOVA) higher VAS score when compared with the transversus abdominis plane (TAP) block group.

POSTER

✘ Pain outcome

✘ Audit 2008

INTRODUCTION

- Recently developed block
- Novel approach to reducing pain from the abdominal wall incision
- May decrease morphine requirements and associated side effects
- Few contraindications
- Substantial component of postoperative pain after abdominal surgery is derived from the abdominal wall incision
- It produces analgesia in the region of the lower 6 thoracic and lumbar dermatomes

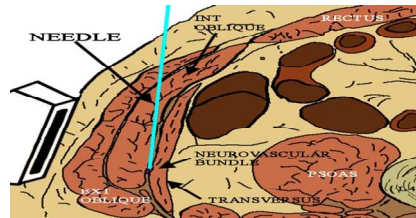
ANATOMY

- 3 muscle layers.
 - External oblique, internal oblique, transversus abdominis
- Abdominal wall is innervated by nerve afferents that course through the transversus abdominis neuro-fascial plane

TRIANGLE OF PETIT

defined as:
Posteriorly- latissimus dorsi muscle
Anteriorly- external oblique
Inferiorly- iliac crest

By introducing local anaesthetic into the transversus abdominis plane via the Triangle of Petit, it is possible to block the sensory nerves of the anterior abdominal wall before they pierce the musculature to innervate the abdomen.



RATIONALE

TAP blocks can produce effective and prolonged post operative analgesia and reduce mean morphine requirements by >70% (1)

- ↓ post-op stress response
- ↓ morbidity
- early ambulation

Easy to perform

AUDIT OF TECHNIQUE

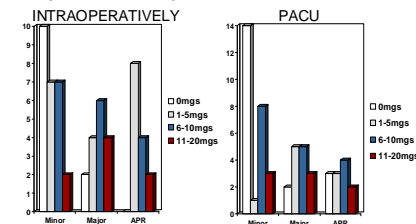
- 53 patients
 - Age range 23 – 81
 - Average age 58 years
- Divided into 3 groups
 - Mini laparotomy - 26
 - Major laparotomy - 15
 - Anterior resection - 12

OUTCOMES

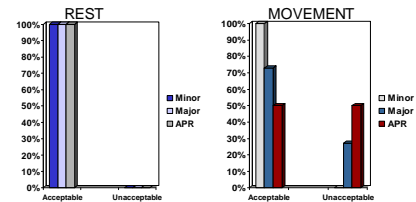
- Discharged from APS caseload;
 - major + APR patients - day 5
 - mini laparotomy - day 2
- 9 patients discharged home - day 4 (mini lap.)
- 3 patients developed paralytic ileus
- 2 patients continued on subcut. opioids >48hrs
- 1 patient required only paracetamol
- 2 patients - oxycodone increased within first 24hrs

RESULTS

MORPHINE ADMINISTERED



PAIN SCORES – FIRST 24HRS



ANALGESIA REQUIRED 0-24HRS

	Mini (n=26)	Major (n=15)	APR (n=12)
Oxycodone	2pts x 2-4 doses	5pts x 2-4 doses	5pts x 2-4 doses
Morphine	/	/	/
Pethidine	/	/	/
Tramadol	4pts x 1-4 doses	5pts x 1-2 doses	3pts x 1-2 doses
Paracetamol (only)	19pts QDS	5pts QDS	4pts QDS

ANALGESIA REQUIRED 24-48HRS

	Mini (n=26)	Major (n=15)	APR (n=12)
Oxycodone	5pts x 2-4 doses	6pts x 2-4 doses 2pts x 5 doses	10pts x 2-4 doses 1pt x 5 doses
Morphine	1pt x 1 dose	2 pts x 2 doses 1pt X 1 dose	
Pethidine			
Tramadol	6pts x 1-4 doses	3pts x 1-2 doses	
Paracetamol (QDS)	18pts	10pts	10pts

1. The analgesic efficacy of Transversus Abdominis Plane Block After Abdominal Surgery: A Prospective Randomized Controlled Trial. McDonnell et al. Anesthesia & Analgesia. 2007



PRAKTICKÉ VYUŽITÍ

✘ Elektivní výkony

- ✘ *Pacienti s PCA*
- ✘ *V případě kontraindikace epidurální anestezie*
- ✘ *Alternativa epiduralní anestezie*

✘ Emergentní výkony

- ✘ *Akutní příhody břišní*
- ✘ *CA pro Sectio Cesarea*

✘ Selhání nebo lateralizace epidurální analgezie

PRAKTICKÉ VYUŽITÍ

- × Výkony na přední stěně břišní
- × Výkony pod úrovní pupku
 - × *Gynekologické výkony*
 - × *Urologické výkony*
 - × *Sectio Cesarea*
 - × *Pediatric anaesthesia*

Úpravy stomií

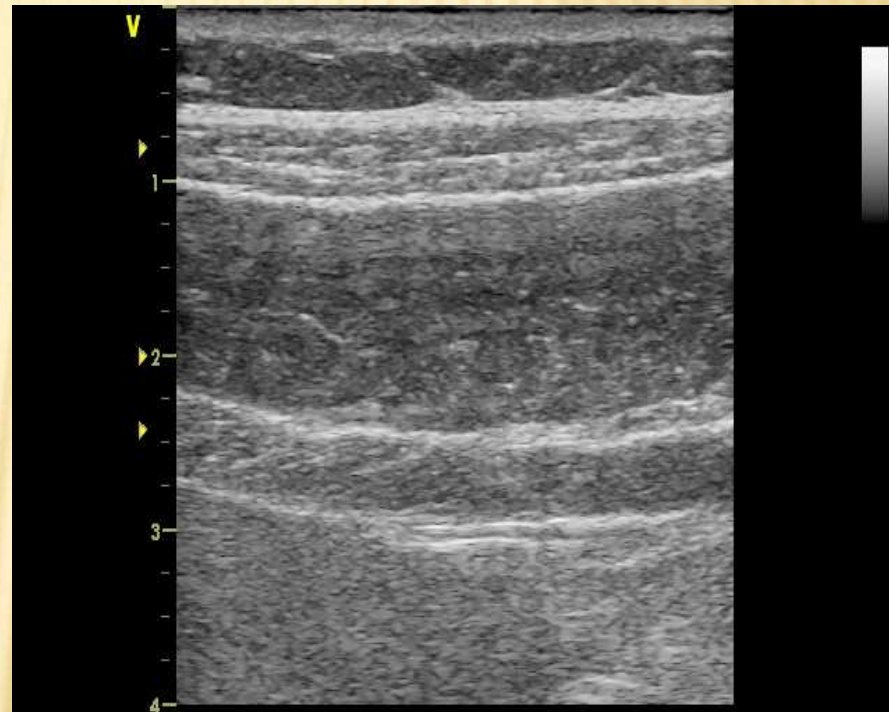
Paraumbilikální hernie

Inquinální hernie

ULTRAZVUK + TAP

- ✘ Jednoduchý UZ obraz
- ✘ 3 svalové vrstvy
- ✘ Bílé linie fasciální
- ✘ M.obl.int. obvykle nejsilnější vrstva
- ✘ M.obl.ext. v oblasti trigonum Petit pouze aponeurozou
- ✘ Peristaltika střev v dutině břišní dobrým orientačním bodem

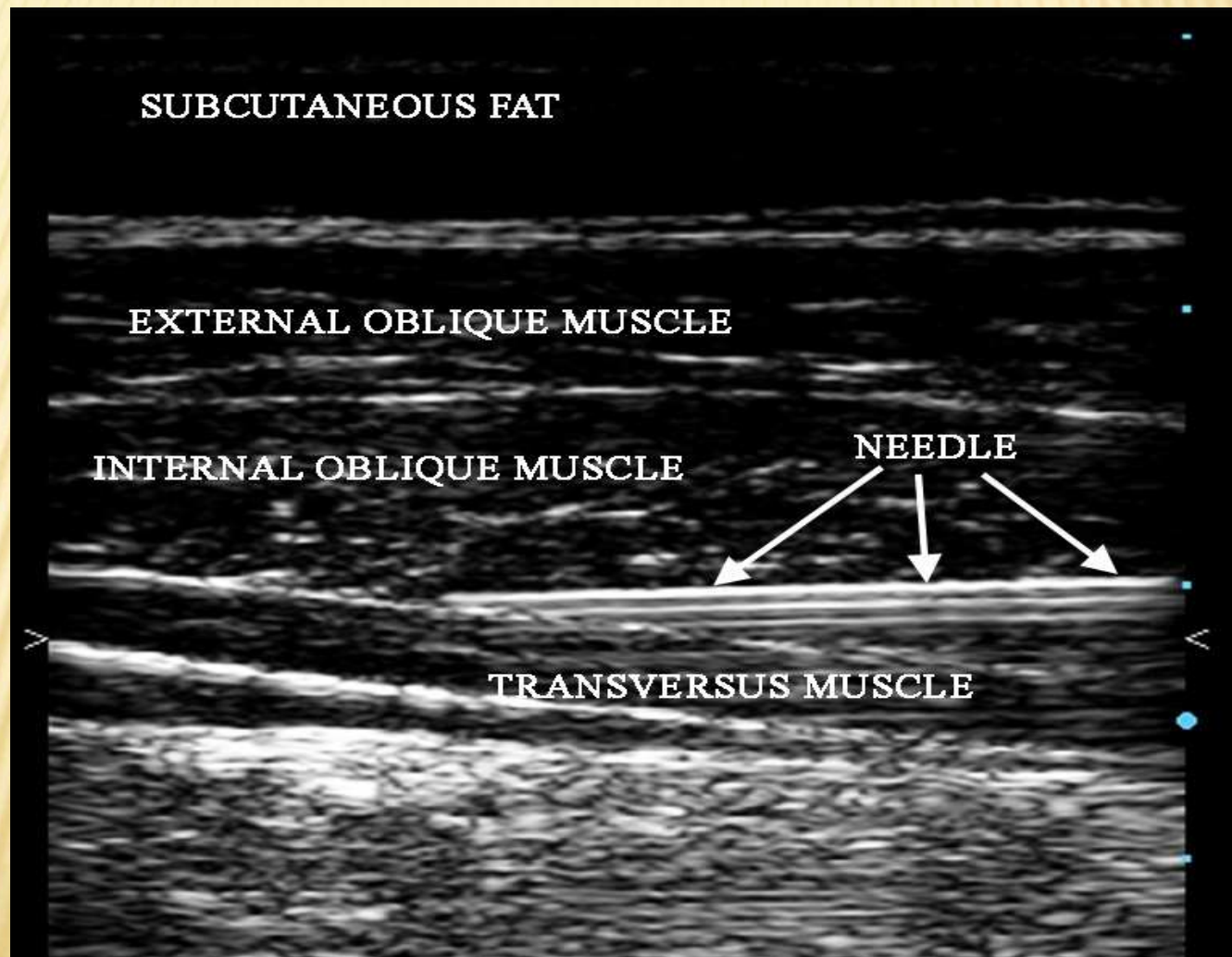
ULTRAZVUK + TAP



TECHNIKA PROVEDENÍ

- ✘ Volba jehly (délka)
- ✘ Příliš strmý úhel jehly = špatný ultrazvukový signál
- ✘ Po proniknutí do TAP a kontrolní aspiraci, je doporučován malý bolus lokálního anestetika (tzv. hydro dissection) k ověření pozice jehly
- ✘ Při intramuskulární aplikaci nedochází k oddělování svalových struktur, bílé fasciální linie zůstávají beze změny – repozice jehly
- ✘ 20-30ml LA oboustranne

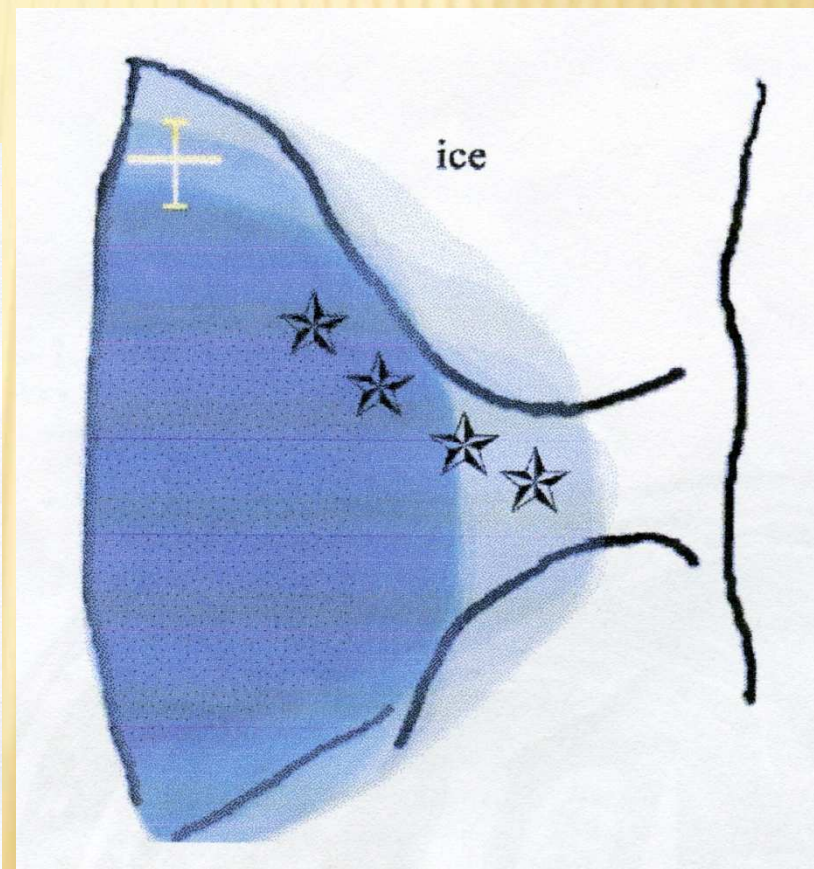
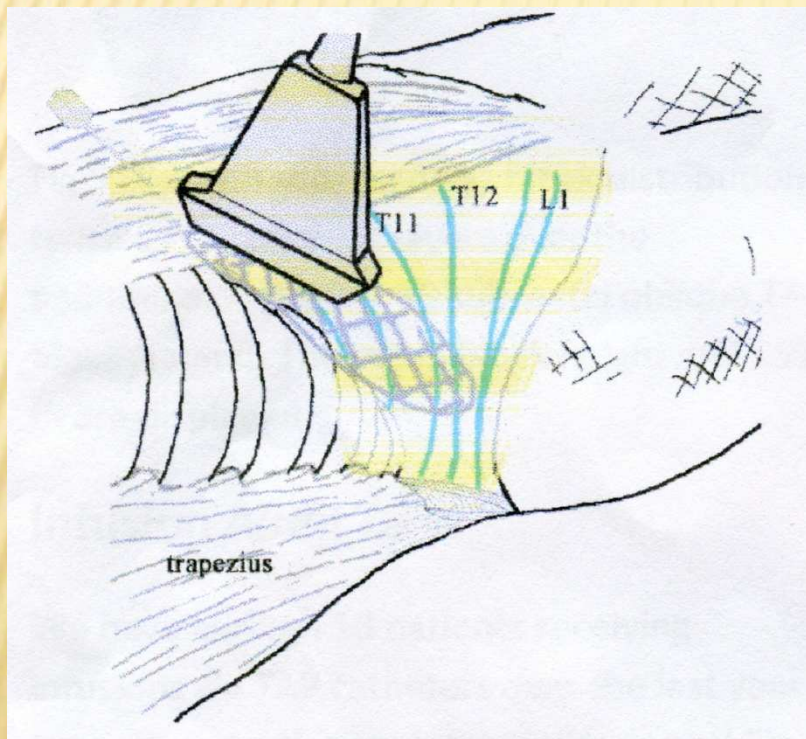
TECHNIKA PROVEDENÍ



MODIFIKACE A KOMBINACE TAP BLOKU

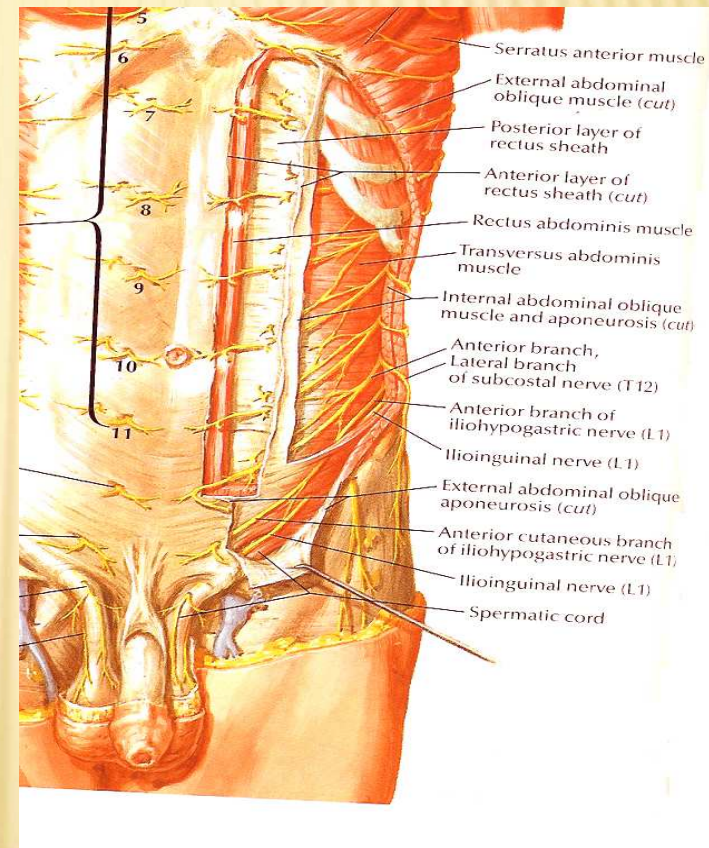
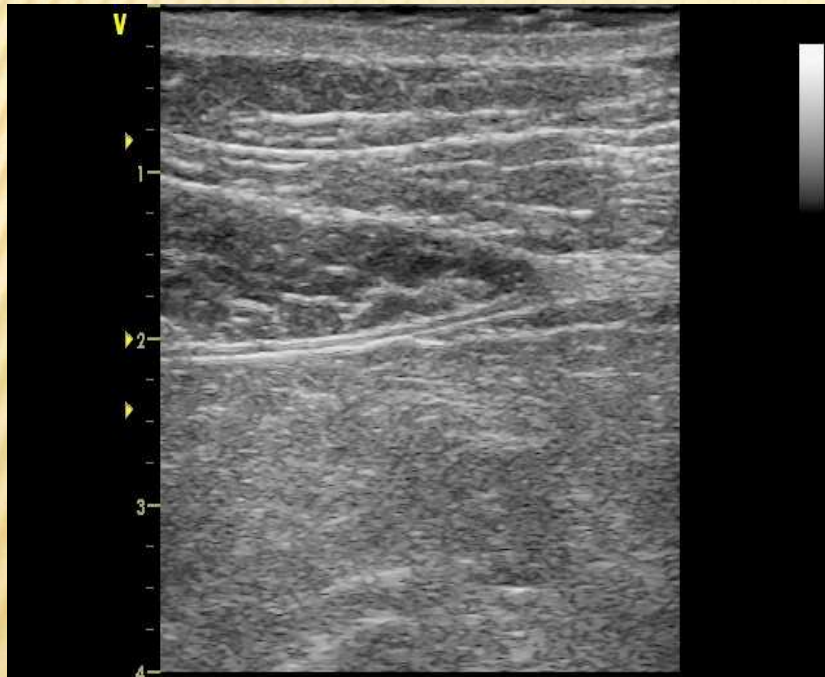
- ✘ Subcostal Oblique TAP block
- ✘ *Shibata Y et al. 2007*

✘



MODIFIKACE A KOMBINACE TAP BLOKU

✘ Rectus Sheath Block



ZÁVĚR

- ✘ Doplněk klasické pooperační analgezie
- ✘ Nenahrazuje dokonalou epidurální anestezii
- ✘ Analgezie břišní stěny nikoliv břišní dutiny jako celku
- ✘ Snadno proveditelný + minimální komplikace
- ✘ Jednoduchá UZ navigace

- ✘ Max. dávka LA versus objem