Inter-fascial Plane Blocks Of Pops and Clicks...



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Overview

- Background
- What options have we and what works? Evidence of benefits?

Transversus Abdominis Plane block (TAP) Quadratus Lumborum block (QL) PECS block Erector Spinae Plane block (ESP)

.... what's current

Issues with IFP blocks Conclusion

Interfascial Plane Blocks...

- First description of interfascial technique *Fascia Iliaca Compartment Block (FICB)* Dalens 1989
- What & How?

block of a multi nerve anatomical section utilizing fascial coverings as a conduit facilitating and limiting spread of LA

- Precision and reproducibility improved with ultrasound
- Most extensively studied fascial plane block

Transversus Abdominis Plane block (TAP) Rafi 2001

Evolution of *TAP block*...

TAP block- good evidence that posterior approach superior to lateral

Duration of analgesic effectiveness after the posterior and lateral transversus abdominis plane block techniques for transverse lower abdominal incisions: a meta-analysis

Abdallah FW, Laffey JG, Halpern SH, Brull R. Br J Anaesth 2013; 111: 721–35.

J. Børglum, Denmark, B. Moriggl, Austria, J.G. McDonnell, Ireland, and T.F. Bendtsen, Denmark

..."**Posterior**" TAP **more effective** than "Lateral" TAP... in terms of duration and reduction in opioid consumption...

...*Carney* described "Posterior" technique resulted in spread to PVB space... similar findings with Blanco –block...

Suggesting that injection in the triangle of Petit may in fact is a "Blanco-block" i.e a QL block

Review Article

[11, 13, 15, 17, 43]

Transversus Abdominis Plane Block: An Updated Review of Anatomy and Techniques



Hsiao-Chien Tsai,¹ Takayuki Yoshida,² Tai-Yuan Chuang,^{3,4} Sheng-Feng Yang,⁵ Chuen-Chau Chang,^{1,6,7} Han-Yun Yao,⁵ Yu-Ting Tai,^{5,7} Jui-An Lin,^{5,7} and Kung-Yen Chen⁵

Approach	The mai	n segmental thoracolumbar nerves [15]	Supplied area [15]		
Subcostal [39-41]	T6-9	Anterior cutaneous branches	Upper abdomen just below the xiphoid and parallel to the costal margin		
Lateral [10, 26]	T10-12	Anterior cutaneous branches	Anterior abdominal wall at the infraumbilical area, from midline to midclavicular line		
Posterior [10, 42]	T9-12	Anterior cutaneous branches (possibly lateral cutaneous branches)	Anterior abdominal wall at the infraumbilical area and possibly lateral abdominal wall between costal margin and iliac crest		
Oblique subcostal	T6-L1	Anterior cutaneous branches	Upper and lower abdomen		

Anterior cutaneous branches

Upper and lower abdomen

TAP block Review... 2017



Regional Anesthesia

Section Editor: Terese T. Horlocker

The Analgesic Efficacy of Ultrasound-Guided Transversus Abdominis Plane Block in Adult Patients: A Meta-Analysis

Moira Baeriswyl, MD,* Kyle R. Kirkham, MD,† Christian Kern, MD,* and Eric Albrecht, MD*

BACKGROUND: Previous meta-analyses of the transversus abdominis plane (TAP) block have examined a maximum of 12 articles, including fewer than 650 participants, and have not examined the effect of ultrasound-guided techniques specifically. Recently, many trials that use ultrasound approaches to TAP block have been published, which report conflicting analgesic results. This meta-analysis aims to evaluate the analgesic efficacy of ultrasound-guided TAP blocks exclusively for all types of abdominal surgeries in adult patients.

METHODS: This meta-analysis was performed according to the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) statement guidelines. The primary outcome was cumulative IV morphine consumption at 6 hours postoperatively, analyzed according to the type of surgery, the type of surgical anesthesia, the timing of injection, the block approach adopted, and the presence of postoperative multimodal analgesia. Secondary outcomes included IV morphine consumption at 24 hours postoperatively; pain scores at rest and on movement at 6 and 24 hours postoperatively; and postoperative nausea and vomiting, pruritus, and rates of complications.

RESULTS: Thirty-one controlled trials including 1611 adult participants were identified. Independent of the type of surgery (abdominal laparotomy, abdominal laparoscopy, and cesarean delivery) but not independent of the type of surgical anesthesia (general anesthesia, spinal anesthesia with or without intrathecal long-acting opioid), ultrasound-guided TAP block reduced IV morphine consumption at 6 hours postoperatively by a mean difference of 6 mg (95% confidence interval [CI], -7 to -4 mg; $l^2 = 94\%$; P < 0.00001). The magnitude of the reduction in morphine consumption at 6 hours postoperatively was not influenced by the timing of injection $(l^2 = 0\%; P = 0.72)$, the block approach adopted $(l^2 = 0\%; P = 0.72)$, or the presence of postoperative multimodal analgesia ($l^2 = 73\%$; P = 0.05). This difference persisted at 24 hours postoperatively (mean difference, -11 mg; 95% Cl, -14 to -8 mg; $l^2 = 99\%$; P < 0.00001). Pain scores at rest and on movement were reduced at 6 hours postoperatively (mean difference at rest, -10; 95% CI, -15 to -5; l² = 92%; P = 0.0002; mean difference on movement, -9; 95% Cl. -14 to -5; $l^2 = 58\%$; P < 0.00001). There were neither differences in the incidence of postoperative nausea and vomiting ($l^2 = 1\%$; P = 0.59) nor in the pruritus ($l^2 = 12\%$; P = 0.58) Two minor complications (1 bruise and 1 anaphylactoid reaction) were reported in 1028 patients. CONCLUSIONS: Ultrasound-guided TAP block provides marginal postoperative analgesic efficacy after abdominal laparotomy or laparoscopy and cesarean delivery. However, it does not provide additional analgesic effect in patients who also received spinal anesthesia containing a long-acting opioid. The minimal analgesic efficacy is independent of the timing of injection, the approach

adopted, or the presence of postoperative multimodal analgesia. Because of heterogeneity of the results, these findings should be interpreted with caution. (Anesth Analg 2015;121:1640–54)

RCTs (4 languages); USG SS TAP with/without GA or SAB V "non-active comparator"; ANY abdominal surgery; up to June 2013;

Outcome:

*cumulative IV morphine @ 6h
*static & dynamic pain scores @ 6h,24h
cumulative morphine @ 24h
time to 1st request
PONV, sedation, satisfaction scores
time to discharge
rates of block complications

31 RCTs (n=1611) Majority **low risk of bias** GA (25); SAB+ (3); SAB- (3) Pre-op- 18; post-op-13 Subcostal-2; Lateral-18; Posterior-8; unknown-3

Primary Outcome: IV Morphine @ 6h reduced by 6mg (-7 to -4; p < 0.00001) Magnitude of reduction persisted in laparotomy: p< 0.00001 Laparoscopy; p- 0.0004 Caesarean delivery; p- 0.04

> Not influenced by timing of injection ; p-0.72 Approach; p-0.72 Presence or absence of multimodal analgesia; p-0.05

Morphine reduction seen in GA (p < 0.00001) In SAB – long opioid ((p < 0.0001) NOT in SAB + long opioid (p-0.05)

MODERATE quality of evidence

For Secondary Outcomes...

Statistically Significant

IV Morphine reduction @ 24h *Mean resting pain Scores* @ 6h *Mean dynamic pain Scores* @ 6h

"...marginal clinical benefit...."

No statistically significant difference in other secondary outcome parameters (PONV; Time to first analgesia request; pruritus; sedation; satisfaction)

> 19 RCTs (n=1028) 2 reported complications 1 anaphylactoid reaction 2 bruising

REVIEW ARTICLE



Clinical safety and effectiveness of transversus abdominis plane (TAP) block in post-operative analgesia: a systematic review and meta-analysis

Ning Ma¹ · Joanna K. Duncan¹ · Anje J. Scarfe¹ · Susanne Schuhmann² · Alun L. Cameron¹

56 RCTs (n= 3428) Comparing 'effectiveness' and 'safety' of TAP Limited to English language No limits on LA type/dose or comparators

Outcome:

Safety: PONV

Itch Drowsiness Intra-op complications

Effectiveness : morphine use time to first analgesia pain

Meta-analysis for TAP versus Comparators Adverse Events - Nausea By Comparators								
Author(s) and Year (N = 21)		TAP		Co	mpar	ator		Odds Ratios [95% CI]
Epidural (n = 1)	N+	N-	total	N+	N-	total		
Wu et al. 2013	5	22	27	6	23	29	⊢ •−1	0.87[0.23, 3.27]
Wound Infiltration (n = 5)								
Sahin et al. 2013	2	27	29	2	26	28		0.96[0.13, 7.35]
brahim and Shamaa 2014	3	18	21	3	18	21		1.00[0.18, 5.63]
Ortiz et al. 2012	17	22	39	13	22	35	⊢ ∎1	1.31[0.51, 3.32]
Skjelsager et al. 2013	7	16	23	6	19	25		1.39[0.39, 4.97]
Chandon et al. 2014	6	30	36	0	29	29	H	12.57 [0.68 , 233.28]
FE Model for Subgroup							\diamond	1.38 [0.73 , 2.62]
No Block (n = 4)								
Tan et al. 2012	2	18	20	4	16	20	⊢ •∔⊣	0.44[0.07, 2.76]
Wuetal. 2013	5	22	27	5	21	26	⊢ •−1	0.95[0.24, 3.78]
Walter et al. 2013	5	28	33	1	34	35	·	6.07[0.67, 55.04]
McDonnell et al. 2008	5	20	25	0	25	25		13.68 [0.71 , 262.17]
FE Model for Subgroup							\diamond	1.42 [0.56 , 3.61]
Placebo (n = 11)								
McDonnell et al 2008	0	25	25	5	20	25	⊢−−− +1	0.07[0.00, 1.40]
Aniskevich et al. 2014	5	5	10	10	1	11	⊢ 	0.10[0.01, 1.10]
Sotani et al. 2014	0	22	22	2	20	22		0.18[0.01, 4.02]
Belavy et al. 2009	8	15	23	14	10	24	H	0.38[0.12, 1.24]
brahim and Shamaa 2014	3	18	21	5	16	21	⊢ ∎+	0.53[0.11, 2.59]
Carney et al. 2010	4	15	19	6	15	21	⊢ •⊢⊣	0.67[0.16, 2.85]
Skjelsager et al. 2013	7	16	23	8	17	25	⊢ •−1	0.93[0.27, 3.16]
Hosgood et al. 2012	10	14	24	9	13	22	⊢ •−1	1.03[0.32, 3.34]
Marais et al. 2014	2	11	13	2	14	15	H	1.18[0.14, 9.83]
Frier et al. 2012	17	15	32	8	24	32		3.40[1.18, 9.81
McKeen et al. 2014	5	30	35	1	38	39	H	6.33 [0.70 , 57.14
FE Model for Subgroup							\$	0.89 [0.56 , 1.42
Fix effect model							•	1.07[0.76, 1.50]
2 statistic = 28.75:							Ĩ	
Heterogeniety test p value = 0.03							<-Favous TAP Favous comparatos ->	
							0 0 0 0 1 1 1 0 0 0 0 0 0 0 0	

Author(s) and Year (N = 13)	TA	P	P Comparator		r		
Epidural block (n = 1)	V+	v٠	total	V•	V-	total	Odds Ratios (95% C
Wuetal. 2013	1	26	27	2	27	29	0.52[0.04, 6.08
Wound Infiltration (n = 2)							
brahim and Shamaa 2014	2	19	21	3	18	21	→ 0.63[0.09, 4.23
Skjelsager et al. 2013	7	18	23	6	19	25	1.39[0.39, 4.97
FE Model for Subgroup							1.09 [0.38 , 3.13
No block (n = 3)							
Tan et al. 2012	0	20	20	1	19	20	H 0.32[0.01, 8.26
Wuetal. 2013	1	26	27	1	25	26	0.96[0.06, 16.22
Walter et al. 2013	4	29	33	0	35	35	→ 10.83 [0.56 , 209.48
FE Model for Subgroup							1.61 [0.28 , 9.10
Placebo (n = 7)							
Belavy et al. 2009	2	21	23	7	17	24	→ 1 0.23[0.04, 1.26
brahim and Shamaa 2014	2	19	21	6	15	21	→ 0.26[0.05, 1.50
Petersen et al. 2012	8	29	37	13	24	37	H 0.51 [0.18 , 1.43
Skjelsager et al. 2013	7	16	23	8	17	25	→ 0.93[0.27, 3.16
McKeen et al. 2014	2	33	35	2	37	39	1.12[0.15, 8.41
Aniskevich et al. 2014	2	8	10	2	9	11	1.12[0.13, 9.94
Frier et al. 2012	7	25	32	2	30	32	4.20 [0.80 , 22.06
FE Model for Subgroup							0.71 0.40, 1.26
Fix effect model							• 0.81[0.51, 1.30
Q statistic = 12.64;							
Heterogeniety test p value = 0.4						_	<-Favous TAP Favous comparatios ->
						0.00	0.02 0.14 1.00 8.00 50.00 300.00
							Oritis Batio

Nausea 21 RCTs *No SS reduction in incidence*

v placebo 0.89 (0.56-1.42) p-0.09

> v No block 1.42 (0.56-3.61)

> v WI 1.38 (0.73-2.62)

Overall 1.07 (0.73-262) p-0.09

Vomiting 13 RCTs *No SS reduction in incidence*

v placebo 0.71 (0.4-1.26) p-0.21

> v standard care 1.61 (0.28-9.10)

> v WI 1.09 (0.38-3.13)

Overall 0.81 (0.51-1.30) p-0.4

	Post-operative Morp By Com	hine Consumption parator	
iuthor(s) and Year (N = 35)	Surgery		Mean Diff (95% Cl)
pidural block (n = 1)			
Vu et al. 2013	gastrectomy	1	Interpretation → 14.00 [6.85 , 21.15]
Vound infiltration (n = 4)			
Sivapurapu et al. 2013	gastrectomy		-7.00 [-9.19 , -4.81]
orahim and Shamaa. 2014	col.res, lap	-	-1.62[-3.76, 0.52]
škjelsager et al. 2013	caesarean		4 0.00[-9.22, 9.22]
Ortiz et al. 2012	ing.hem	H#H	0.70[-3.65, 5.05]
RE Model for Subgroup		~~	-2.57 [-6.44 , 1.29]
Tacebo (n = 21)			P = 60.60%, P1 = (-10.13, 4.90)
e Oliveria. 2011	caesarean	H	-39.00 [-52.14 , -25.86]
le Oliveria. 2011	renal.trans	— · · · ·	-38.00 [-57.90 , -18.10]
aajetal. 2010	prostatectomy		-36.11 [-39.18 , -33.04]
oltani et al 2014	prostatectomy	H=H	-30.40 [-34.68 , -26.12]
Ikassabany et al. 2013	gymae, lap	H=	-23.40 [-31.62 , -15.18]
niskevich et al. 2014	abdo (nos)	⊢i	-22.10[-45.36, 1.16]
arney et al. 2008	renal trans	H=	-18.60 [-26.49 , -10.71]
riramka et al. 2012	chole, lap	H	-14.20 [-17.34 , -11.06]
elavy et al. 2009	appdend.	H	-13.50 [-23.94 , -3.06]
arikh et al. 2013	caesarean	H	-13.20 [-15.23 , -11.17]
larais et al. 2014	col res, open	H=	-12.10[-19.90, -4.30]
narti et al. 2011	hysterc, open		-11.10[-14.01, -8.19]
rahim and Shamaa. 2014	siv. gasitr, lap	-	-8.00 [-10.43 , -5.57]
e Oliveira. 2011	siv, gastr, lap	H=H	-7.50[-11.55, -3.45]
osgood et al. 2012	renal trans		-7.10[-23.14, 8.94]
rier et al. 2013	gynae, open		-1.00[-3.70, 1.70]
e Oliveira. 2011	renal trans	H	0.00[-5.76, 5.76]
kjelsager et al. 2013	prostatectomy	⊢ –	4 0.00[-8.97, 8.97]
alle et al. 2014	chole, lap	•	0.31[-0.17, 0.79]
iniffiths et al. 2010	gynae, lap		2.00 [-11.37, 15.37]
cKeen et al. 2014	gynae, lap		4 2.10[-5.50, 9.70]
E Model for Subgroup		\rightarrow	13.21 [-18.70 , -7.72]
o Block (n = 9)			r = 98.23%, PI = (-37.40, 10.98)
CDonnell et al. 2007	hysterc, lap	H	-58.50 [-68.87 , -48.13]
amman et al. 2014	hysterc, lap	H	-26.00 [-28.66 , -23.34]
iraj et al. 2009	hysterc, open	H	-22.00 [-32.59 , -11.41]
alter et al. 2013	hysterc, open	— •—	-20.00[-31.78, -8.22]
an et al. 2012	colires, open	H	-19.10 [-20.87 , -17.33]
vu et al. 2013	caesarean	H H H	-19.00 [-26.42 , -11.58]
I-Dawlathy et al 2009	caesarean	H#H	-12.30 [-16.07 , -8.53]
harma et al. 2013	nephr, lap		-8.00[-8.61,-7.39]
Iberecht et al. 2014	gas.byp, lap	H=	-3.40 [-11.63 , 4.83]
RE Model for Subgroup		\rightarrow	-20.60 / -30.55 , -10.64 /
		~	I ² = 99.08%. PI = (-51.23. 10.03)
andom Effect Model		-	-13.05[-17.78 -8.33]
= 99.27		•	
rediction interval (-40.20. 14.10)		C- Favours TAP	Favous Competatos ->
	-80.00 -60	00 -40.00 -20.00 0.00	20.00 40.00
		Mean Difference	
		Contraction of the second	

Meta-analysis for TAP versus Comparator Time to First Analgesic Request By Comparator							
Author(s) and Year (N = 20) Placebo (n - 10)	Surgeries	Mean Diff, 95% Cl					
Aniskevich et al. 2014	ingu.hem	-9.00 [-27.62 , 9.62]					
De Oliveira 2011	gynaeco, laparo	6.00 [-4.58 , 16.58]					
De Oliveira 2011	abdominal	7.00 [1.71, 12.29]					
Carney et al. 2008	ingu.hem	32.50 [5.03 , 59.97]					
Carney et al. 2010	nephrect.	39.00 [-51.22 , 129.22]					
Belavy et al. 2009	colo.resec HEH	60.00 [20.07 , 99.93]					
Ibrahim and Shamaa 2014	caesarean HEH	74.00 [40.13 , 107.87]					
Elkassabany et al. 2013	caesarean -	120.00 [-19.68 , 259.68]					
McDonnell et al 2008	gastr, laparo	130.00 [52.56 , 207.44]					
Parikh et al. 2013	gastr. laparo	497.96 [402.03 , 593.89]					
RE Model for Subgroup	\rightarrow	91.08 [2.62 , 179.53]					
		I ² = 99.49%, PI = (-194.91, 377.06)					
No block (n = 6)							
Tamman et al. 2014	prostatec.	1.80[-1.33, 4.93]					
Lee et al. 2013	hysterec.	12.00 [-54.49, 78.49]					
Alberecht et al. 2014	hysterec.	27.00 [13.44 , 40.56]					
Al-Sadek et al. 2014	appendic.	30.80 [4.08 , 57.52]					
McDonnell et al. 2007	hysterec.	133.10 [119.02 , 147.18]					
Sharma et al. 2013	caesarean 📕	155.00 [138.63 , 171.37]					
RE Model for Subgroup		61.58 [7.58 , 115.57]					
		I ² = 98.97%, PI = (-78.28, 201.43)					
Wound Infiltration (n = 4)							
Sivapurapu et al. 2013	caesarean 📕	62.62 [39.46 , 85.78]					
Aydogmus et al. 2014	nephrect.	208.80 [132.69 , 284.91]					
Ibrahim and Shamaa 2014	caesarean H	273.00 [240.67 , 305.33]					
Sahin et al. 2013	gas.byp. laparo	738.00 [585.31 , 890.69]					
RE Model for Subgroup		313.64 [35.48 , 591.80]					
		I ² = 99.38%, PI = (-302.36, 929.65)					
Random Effect Model		123.49 [48.59 , 198.39]					
i ² = 99.83%							
Prediction interval (-214.13, 461.11) <- Favous Comparator Favous TAP ->							
	-150.00 0.00 200.00 400.00 600.00	800.00					
	Mean Difference						

Post-op morphine consumption @ 24h 35 RCTs v all comparator types Overall SS reduction 13.05 mg (8.33-17.78) $p \le 0.05$ TAP v no block 20.60 (10.64 - 30.56); $p \le 0.05$ TAP v placebo 13.21 (7.72-18.70); $p \le 0.05$ No SS difference v WI 2.57 (-1.29 to 6.44); p = 0.19High heterogeneity

Time to First Analgesic request 20 RCTs Overall SS increased time by 123.49 m (48.59 – 198.39) TAP v No block $61.58 (7.58 - 115.57); p \le 0.05$ TAP v placebo $91.08 (2.62 - 179.53); p \le 0.05$ TAP v WI $313.64 (35.48 - 591.80); p \le 0.05$ High heterogeneity

Pain-related Outcomes

No meta-analysis could be performed due to inconsistent and subjective measures

4-8h - Early pain (41 RCTs)Late Pain (≥ 24h)

> NONE showed TAP to have poorer performance for early or late pain.

Conclusion

.. **TAP block** to be **a safe procedure** compared to both standard postoperative care and other analgesic techniques such as wound infiltration and epidural block..

... is **associated with reducing consumption** and **delaying the requirement** for opioids

TAP provides equivalent or improved patient outcomes compared to other analgesia techniques

From Previous Meta-analyses...

24h Morphine consumption:

10 RCTs in Laparoscopic surgeries: De Oliveira 2014... 5.7 mg12 RCTs in lower abdominal incisions: Abdallah 2013... 9.1 mg

22 *RCTs* (from 31): *Baeriswyl* 2015

-USG TAP -no active comparators -all types of surgeries

... 11 mg

35 *RCTs* (from 56): *Ning Ma* 2017

-active comparators -all types of surgeries

... 13.05 mg

From Previous Meta-analyses...

Time to First analgesic request

Baeriswyl 2015

2 RCTs; 60 each (v placebo) 248 min (-238 to 734); *p* = **0.34**

Ning Ma 2017

20 RCTs; Overall 123.49 min (48.59 – 198.39)

> No block; 61.58 (7.58 – 115.57) Placebo; 91.08 (2.62 – 179.53) WI; 313.64 (35.48 – 591.80)

Block related complications:

Baeriswyl 2015;

19 RCTs (n=1028) 2 reported; anaphylactoid bruising

Ning Ma 2017;

42 RCTs: NO reported complications 13 RCTs did not report

From Previous Meta-analyses...

Pain – related outcome:

Baeriswyl 2015:

Resting pain scores @ 6h : 24 RCTs -9.7 (-14.8 to -4.6): p- 0.0002 Dynamic pain scores @ 6h: 26 RCTs -9.4 (-13.5 to -5.4): p < 0.00001

Resting pain scores @ 24h : 26 RCTs -4.3 (-8.8 to 0.02): p- 0.05 Dynamic pain scores @ 24h: 20 RCTs -5.9 (-12.3 to 0.4): p- 0.07

Ning Ma 2017: (41 RCTs)

Pain scores not defined.... Early : 4-8h Late: >24h

No meta-analysis done (ranges in measures reported)

Conclusion TAP

Moderate quality level of evidence

... Safe procedure...

...Statistically significant reduction in early peri-operative and for Types of Surgery, Anaesthesia, block timing, approach, ± multi-modal AND @ 24h morphine consumption ... although may only clinically be marginal....

None showed poorer performance than active comparator for pain scores and times to first analgesic request...