

# Remifentanil a poporodní adaptace novorozence

Petr Štourač

KARIM LF MU a FN Brno

- Remifentanil a novorozenecký outcome – PubMed.org
- Novorozenecký outcome a opioidy
- Remifentanil a vliv na poporodní adaptaci novorozence
- Remifentanil a intrauterinní monitorace plodu
- Poporodní adaptace novorozence u SC s remifentanilem
- Závěr - bezpečnost remifentanilu

- PubMed

- „remifentanil“ + „neonatal outcome“ 33

- z toho 7 v roce 2013

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[Remifentanil versus Morphine-Midazolam Premedication on the Quality of Endotracheal Intubation in Neonates: A Noninferiority Randomized Trial.](#)  
1. Avino D, Zhang WH, De Villé A, Johansson AB. J Pediatr. 2014 Feb 25. pii: S0022-3476(14)00058-4. doi: 10.1016/j.jpeds.2014.01.030. [Epub ahead of print] PMID: 24582007 [PubMed - as supplied by publisher] [Related citations](#)

[A randomized controlled trial of the efficacy and respiratory effects of patient-controlled intravenous remifentanil analgesia and patient-controlled epidural analgesia in laboring women.](#)  
2. Stocki D, Matot I, Einav S, Eventov-Friedman S, Ginosar Y, Weiniger CF. Anesth Analg. 2014 Mar;118(3):589-97. doi: 10.1213/ANE.0b013e3182a7cd1b. PMID: 24149580 [PubMed - in process] [Related citations](#)



## Novorozenecký outcome a opioidy

- Opioidy přestupují dobře transplacentárně
- Remifentanil čistý  $\mu$  agonista
  - Oproti jiným  $\mu$  agonistům (i parciálním a smíšeným) krátký poločas a neprodlužující se context-sensitive halftime
- Koncentrace v pupečnickové krvi 88% matčiny
- Rychlá redistribuce a metabolizace novorozencem (poměr VU a AU 0,29)

Kan RE, et al. Intravenous remifentanil: placental transfer, maternal and neonatal effects. *Anesthesiology* 1998;88(6):1467e74

## Remifentanil a intrauterinní monitorace plodu

- Studován vliv na běžnou monitoraci plodu CTG a STAN
- Nebyl nalezen statisticky významný rozdíl oproti epidurální analgezii i spontánnímu porodu
- Bez rozdílu v CTG a výskytu decelerací

Štourač P, Suchomelová H, Stodůlková M et al. Comparison of Parturient-Controlled Remifentanil with Epidural Bupivacain and Sufentanil for Labour Analgesia: Randomised Controlled Trial. Biomed P 2012; 3 DOI: 10.5507/bp.

- Studován vliv na APGAR, ABR pupečnickové krve a potřeba podání naloxonu
- Žádná publikovaná studie nezaznamenala rozdíl oproti epidurální analgezii či spontánnímu porodu

Štourač P, Suchomelová H, Stodůlková M et al. Comparison of Parturient-Controlled Remifentanil with Epidural Bupivacain and Sufentanil for Labour Analgesia: Randomised Controlled Trial. *Biomed P* 2012; 3 DOI: 10.5507/bp.

D'Onofrio P, et al. The efficacy and safety of continuous intravenous administration of remifentanil for birth pain relief: an open study of 205 parturients. *Anesth Analg* 2009;109(6):1922e4.

Buehner U, Broadbent JR, Chesterfield B. Remifentanil patient-controlled analgesia for labour: a complete audit cycle. *Anaesth Intensive Care* 2011;39(4):666e70.

Stocki D, Matot I, Einav S, Eventov-Friedman S, Ginosar Y, Weiniger CF. A Randomized Controlled Trial of the Efficacy and Respiratory Effects of Patient-Controlled Intravenous Remifentanil Analgesia and Patient-Controlled Epidural Analgesia in Laboring Women. *Anesth Analg*. 2013 Oct 21.

Blair JM, Hill DA, Fee JP. Patient-controlled analgesia for labour using remifentanil: a feasibility study. *Br J Anaesth* 2001;87(3):415e20

Douma MR, et al. A randomised comparison of intravenous remifentanil patient-controlled analgesia with epidural ropivacaine/sufentanil during labour. *Int J Obstet Anesth* 2011;20(2):118e23.

**Table 1. Characteristics of the Parturients Completing the Study.**

No.	Analgesia	Age (years)	Gravidity duration (weeks + days)	Parity	Labour induction	Height (cm)	Weight (kg)	BMI (m <sup>2</sup> /kg)	Duration of labour stages (min)			Analgesia Duration (min)	Apgar score			pH
									1st	2nd	3rd		1st min	5th min	10th min	
1	EA	32	40+0	II	W/O	171	101	34.54	260	10	45	122	9	10	10	-
2	EA	28	37+3	I	W/O	165	96	35.26	340	0	2	325	9	10	10	7.32
3	EA	29	41+0	I	YES	168	87	30.82	150	50	25	150	9	10	10	7.31
4	EA	30	41+2	I	YES	167	78	27.97	260	5	10	190	9	9	9	-
5	EA	31	39+4	II	YES	170	93	32.18	160	10	10	60	7	8	9	7.21
6	EA	28	39+0	I	YES	158	54	21.63	135	5	10	100	10	10	10	7.4
7	EA	30	40+4	I	YES	168	73	25.86	265	10	35	220	3	6	8	6.99
8	EA	24	39+4	I	W/O	173	82	27.4	335	10	10	185	9	10	10	7.18
9	EA	32	40+2	I	YES	171	76	25.99	220	15	15	225	9	9	10	-
10	EA	29	39+3	I	YES	163	83	31.24	270	30	10	150	9	10	10	7.33
11	EA	30	40+3	I	W/O	170	124	42.91	365	10	10	300	9	10	10	-
12	EA	30	41+1	I	YES	175	83	27.1	200	10	10	105	10	10	10	7.4
	Mean	29.4	40+0			168.3	85.83	30.24	246.7	13.75	16	177.67	8.5	9.3	9.67	7.27
	SD	2.05	1+0			4.42	16.75	5.35	76.3	13.51	12.54	80.17	1.88	1.23	0.65	0.137
	Median	30	40+1			169	83	29.395	260	10	10	167.5	9	10	10	7.315
13	rPCA	24	41+5	I	YES	165	80	29.38	340	15	45	273	7	8	8	-
14	rPCA	23	37+6	I	YES	165	74	27.18	165	10	10	65	8	10	10	7.14
15	rPCA	31	39+2	I	W/O	172	70	23.66	260	10	25	160	9	10	10	-
16	rPCA	29	38+4	III	YES	162	69	26.29	335	5	5	205	9	10	10	7.31
17	rPCA	32	40+2	II	YES	168	75	26.57	150	15	25	50	8	9	9	7.32
18	rPCA	29	38+1	II	YES	168	89	31.53	355	5	5	170	10	10	10	7.06
19	rPCA	32	39+2	II	YES	170	77	26.64	235	5	5	90	9	9	10	7.4
20	rPCA	29	40+2	I	W/O	165	86	31.59	240	10	15	195	9	10	10	-
21	rPCA	27	41+4	I	YES	165	133	48.85	250	10	15	200	9	9	10	7.2
22	rPCA	25	39+1	I	YES	164	81	30.12	315	40	10	290	9	10	10	-
23	rPCA	29	40+3	I	YES	176	98	31.64	230	10	10	90	9	9	9	7.31
24	rPCA	25	36+6	I	YES	164	76	28.26	255	0	15	165	9	10	10	7.33
	Mean	27.9	39+3			167	84	30.14	260.8	11.25	15.42	162.75	8.75	9.5	9.67	7.26
	SD	2.95	1+3			3.83	16.75	6.13	65.5	10.01	11.57	77.15	0.75	0.67	0.65	0.107
	Median	29	39+1.5			165	78.5	28.82	252.5	10	12.5	167.5	9	9	10	7.31

BMI - body mass index; EA - epidural analgesia; rPCA - remifentanil parturient controlled analgesia;

**Table 2. Comparison of Parturients Characteristics, Neonatal, Labour and VAS Course Parameters.**

	EA Mean	rPCA Mean	P
Age (years)	29.42	27.92	NS
Gestures (days)	279.83	276.16	NS
Labor induction	0.66	0.83	NS
Height (cm)	168.25	167.00	NS
Weight (kg)	85.83	84.00	NS
BMI (m <sup>2</sup> /kg)	30.24	30.14	NS
1st stage (min)	246.67	260.83	NS
2nd stage (min)	13.75	11.25	NS
3rd stage (min)	16.00	15.42	NS
pH	7.27	7.26	NS
VAS 0 h (N=24)	7.33	7.04	NS
VAS 0.5 h (N=24)	3.29	4.13	NS
VAS 1.0 h (N=22)	4.14	4.64	NS
VAS 1.5 h (N=19)	4.05	5.33	NS
VAS 2.0 h (N=16)	4.09	5.88	NS
Satisfaction (%)	88	85	NS

NS (Not Significant P>0.05); BMI (Body Mass Index); VAS (Visual Analogue Score)

Štourač P, Suchomelová H, Stodůlková M et al. Comparison of Parturient-Controlled Remifentanil with Epidural Bupivacain and Sufentanil for Labour Analgesia: Randomised Controlled Trial. Biomed P 2012; 3 DOI: 10.5507/bp.

**Table 2. Meta-Analysis Results and Quality of Evidence on the Comparison of Patient-Controlled IV Analgesia and Epidural Analgesia**

Outcome	Trials	Participants	Statistical method	Effect estimate	I <sup>2</sup>	GRADE
1 h VAS scores (cm)	5	884	RE, MD, 95% CI	1.9 (0.5–3.3) <sup>a</sup>	94%	Low
2 h VAS scores (cm)	3	58	RE, MD, 95% CI	3.0 (0.7–5.2) <sup>a</sup>	89%	Moderate
Nausea	4	862	FE, RR, 95% CI	0.87 (0.60–1.26)	0%	Moderate
Pruritus	3	817	FE, RR, 95% CI	0.46 (0.20–1.07)	0%	Moderate
Vomiting	3	817	RE, RR, 95% CI	1.56 (0.47–5.21)	68%	Moderate
Umbilical artery pH	5	878	FE, MD, 95% CI	0.01 (0.00–0.02) <sup>a</sup>	37%	Moderate

Liu ZQ1, Chen XB, Li HB, Qiu MT, Duan T. A comparison of remifentanil parturient-controlled intravenous analgesia with epidural analgesia: a meta-analysis of randomized controlled trials. Anesth Analg. 2014 Mar;118(3):598-603. doi:

10.1213/ANE.0000000000000077.

# Novorozenecký outcome podání remifentanilu u SC

- Statistický rozdíl
- Klinicky nevýznamný
- Favorizuje kontrolu

Heesen M, Klöhr S, Hofmann T, Rossaint R, Devroe S, Straube S, Van de Velde M. Maternal and foetal effects of remifentanil for general anaesthesia in parturients undergoing caesarean section: a systematic review and meta-analysis. *Acta Anaesthesiol Scand.* 2013 Jan;57(1):29-36.

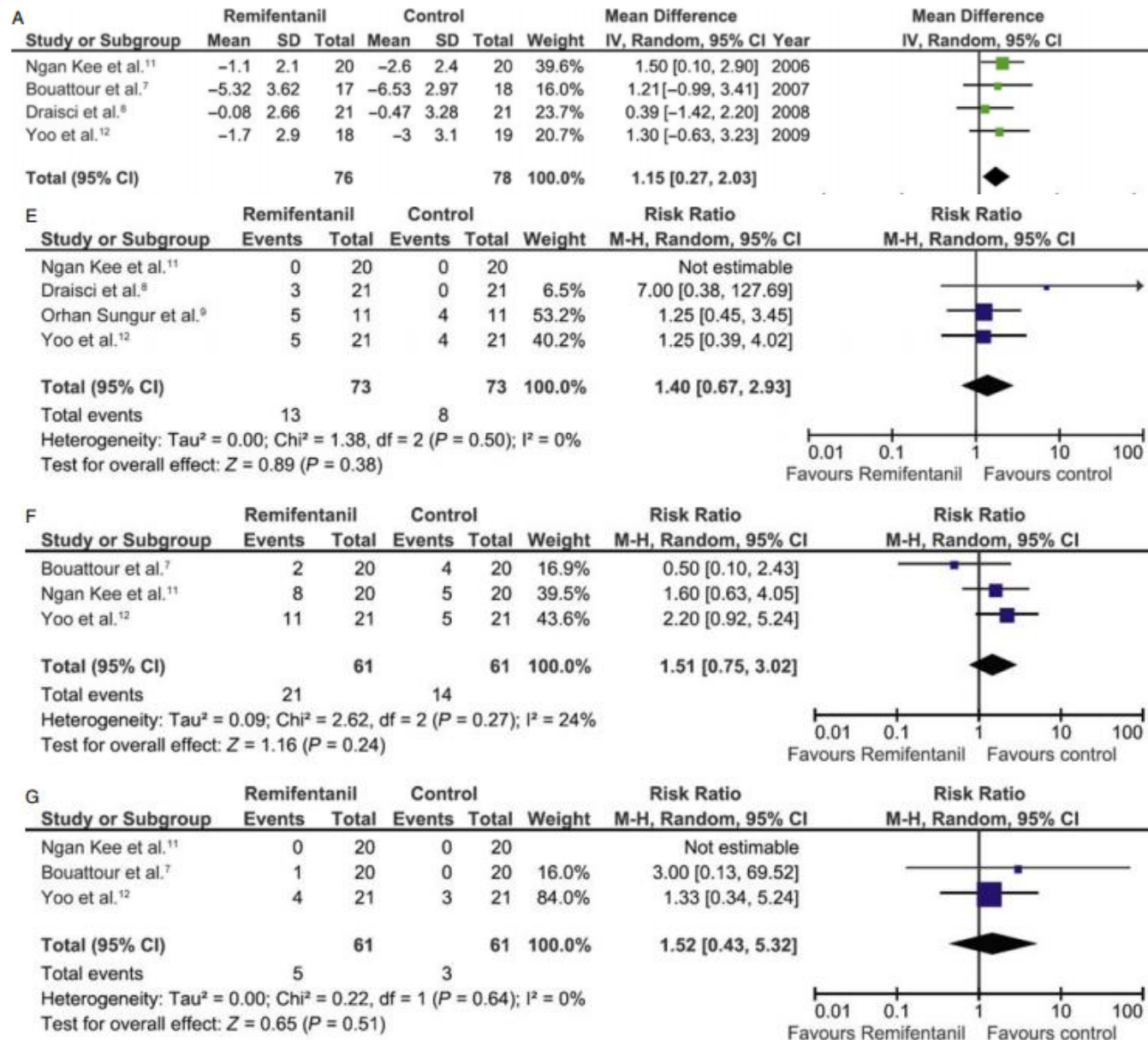


Fig. 3. Neonatal outcome. (A) Base excess (BE) data of the neonate. (B) pH data of the neonate. (C) Partial pressure of carbon dioxide data of the neonate. (D) Mask ventilation of the neonate. (E) Intubation of the neonate. (F) Apgar <7 at 1 min. (G) Apgar <7 at 5 min. CI, confidence interval; SD, standard deviation; IV, inverse variance; M-H, Mantel-Haenszel.



## Závěr - bezpečnost remifentanilu u porodu

- Přes velmi optimistické závěry stran minimálního ovlivnění novorozenecké poporodní adaptace je nutné mít na paměti
  - Málo publikovaných studií
  - Relativně selektovaný vzorek
  - Remifentanil je  $\mu$  agonista se stejnými nežádoucími účinky jako mají jiné opioidy
  - Pro riziko útlumu dechu je nutné mít kompletní vybavení pro resuscitaci novorozence při použití remifentanilu v peripartálním období
  - Porodní sál musí být vybaven naloxonem

Volikas I, et al. Maternal and neonatal side-effects of remifentanil patientcontrolled analgesia in labour. Br J Anaesth 2005;95(4):504e9.



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