

FINDING THE BEST PROGRAMMED INTERMITTENT EPIDURAL BOLUS (PIEB) COMBINATION OF BOLUS VOLUME & TIME INTERVAL FOR NEURAXIAL LABOUR ANALGESIA USING PRAGMATIC SEQUENTIAL OPTIMISATION

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INTRODUCTION

PIEB provides neuraxial labour analgesia using a preset volume of epidural mixture as an automated bolus over a fixed time interval. PIEB has local anesthetic sparing effects (vs. continuous infusion) with less motor block without compromising analgesia. The optimal PIEB volume and interval have been studied separately. Our pragmatic trial used a novel methodology to assess the best PIEB regimen with the least rescue analgesia for breakthrough pain and minimal lower limb motor blockade.

METHODOLOGY

Our randomized double-blind prospective trial used a sequential optimization method¹. We recruited labouring nulliparous term pregnant women requesting epidural analgesia. PIEB volumes (8 to 12ml) and intervals (30 to 75 min), chosen based on previous studies, was delivered at a flow rate of 250ml/hour using a CADD Solis® epidural pump. A 5ml PCEA bolus (20 min lockout) was available for all groups. For **Complex 1**, we randomised 48 women into 8 different groups of PIEB regimens (n=6 per group) using 0.1% bupivacaine + 2mcg/ml fentanyl. The two worst performing groups, ranked by the need for rescue analgesia (PCEA + Clinician bolus) and Bromage score, were excluded from the 2nd round of recruitment (**Complex 2**). Using sequential optimization, 2 new groups (Gp 9 and 10) with different combinations of PIEB volume / interval were added to the remaining 6 groups (48 patients, n=6 per group).

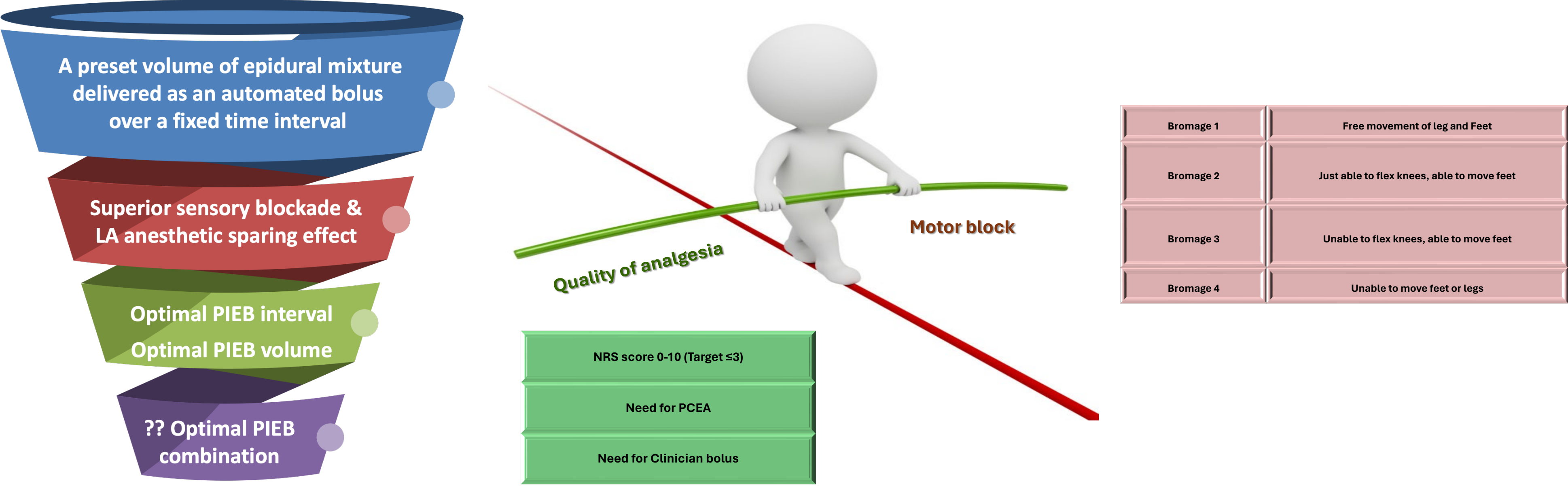


TABLE						
Group (PIEB Volume ml, Interval - min)	Complex 1		Complex 2			
	Rescue analgesia* (ml/hour)	Bromage	Rescue analgesia* (ml/hour)	Bromage	Simple Rank (Pain + Bromage) **	Simple Rank (Pain weighted)***
	Mean	Mean	Mean	Mean		
1 (8,60)	3.25	1.5	3.18	1.33	7	7
2 (8,45)	3.65	2	2.91	1.75	8	8
3 (10,30)	0.49	2.7				
4 (10,45)	0.05	1.2	0.26	1.42	2	1
5 (10,60)	3.32	1.3	2.81	1.33	4	6
6 (10,75)	3.89	2				
7 (12,60)	1.31	1.7	1.93	1.33	3	4
8 (12,45)	2.04	2.2	1.52	1.67	6	5
9 (10,50)			1.06	1.17	1	2
10 (10,40)			0.37	1.83	5	3

Rescue analgesia for breakthrough pain = PCEA + Clinician bolus
** Simple Rank (Pain + Bromage) derived by ranking (Rank rescue analgesia + Rank Bromage) / 2
*** Simple Rank (Pain weighted) derived by ranking (Rank rescue analgesia x 2 + Bromage) / 2



RESULTS

After completing **Complex 1**, we excluded Gp 3 (worst Bromage) and Gp 6 (highest rescue analgesia). In **Complex 2**, Gp 4 and 9 performed the best.

DISCUSSION

A 10ml PIEB volume with a 45 to 50 min interval appears optimal. Higher intervals compromised analgesic quality, increasing motor block from more rescue analgesia. Lower intervals reduced rescue analgesia but with more motor block. **Complex 3** will compare a new PIEB group (8ml vol, 40min interval) with the best performing groups

REFERENCES

Sveticic G, et al. Combinations of morphine with ketamine for patient-controlled analgesia. A new Optimiztion method. Anesthesiology 2003; 98: 1195-1205