

Analgesic Efficacy and Pharmacokinetics of Lidocaine by Erector Spinae Plane versus Intravenous Route: A Randomized Clinical Trial

Archit Sharma, Breethaa Janani Selvamani, Bassam Farhat, Levent Sahin, Melinda Seering, Michelle Parra, Tejindersingh Swaran Singh, Justin Wikle, Yair Rubin, Arun Singhal, Mohammad A Bashir, Rakesh V Sondekoppam

INTRODUCTION

- The Erector Spinae Plane (ESP) block is a popular regional analgesic technique for providing truncal analgesia
- Primary objective was to evaluate the analgesic efficacy of lidocaine administered through bilateral ESP blocks, in comparison to IV route, following cardiac surgery

METHODS

- Prospective randomized clinical trial - open label design.
- Patients were randomized to receive lidocaine 2 mg/kg ideal body weight (IBW) bolus followed by continuous infusion 2 mg/kg/hour IBW, either through continuous bilateral ESP block catheters (ESP group), or intravenous route (IV group) for the first 48 hours postoperatively.
- Lidocaine levels assessed in arterial blood samples at 5, 30, 60, 120 minutes, 6 and 24 hours.
- Pain scores, opioid consumption, and adverse events were assessed.

RESULTS

- 61 patients included in final analysis.
- No statistically significant difference in pain scores and opioid consumption between both groups. (Fig 1, Table)
- Arterial plasma lidocaine levels were higher in the IV lidocaine group at 5, 30, 60 and120 minutes with the plasma lidocaine concentration achieving analgesic range (2-5 mcg/ml) at 6 hours in both groups (Table).
- The plasma lidocaine concentration was comparable between both groups at 24 h. (Fig 2)

DISCUSSION

- Analgesic efficacy of lidocaine through ESP blocks versus IV routes was comparable under study conditions
- The plasma concentration of lidocaine increased over time in both groups but paralleled IV group after 6h with ESP
- At 24 postoperative hours, both groups had many patients with therapeutic levels of plasma lidocaine.

Analgesic efficacy of lidocaine through ESP block was comparable to IV route and, plasma lidocaine level increased over time with continuous infusion in both groups.

Figure 1.

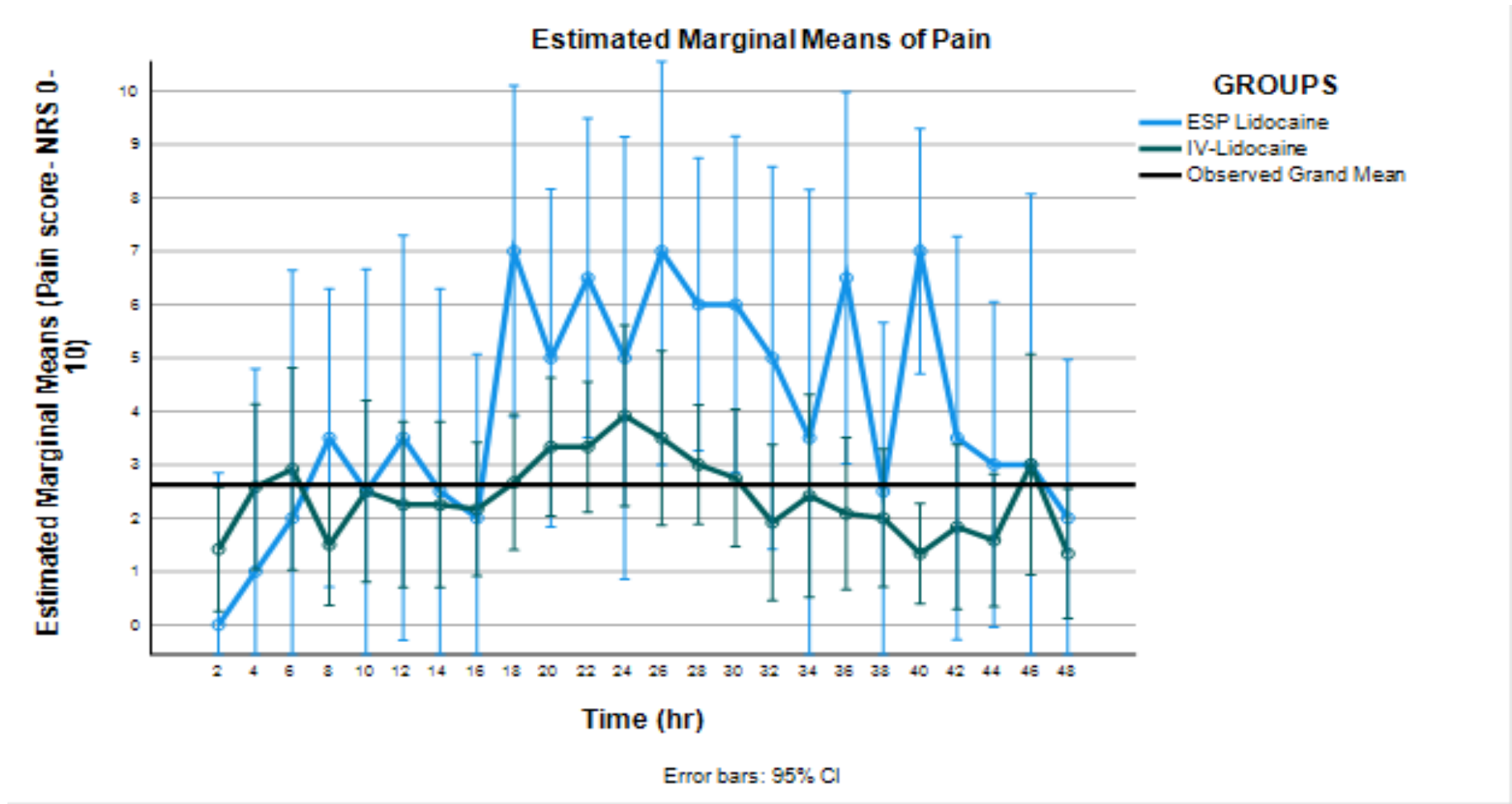


Figure 2.

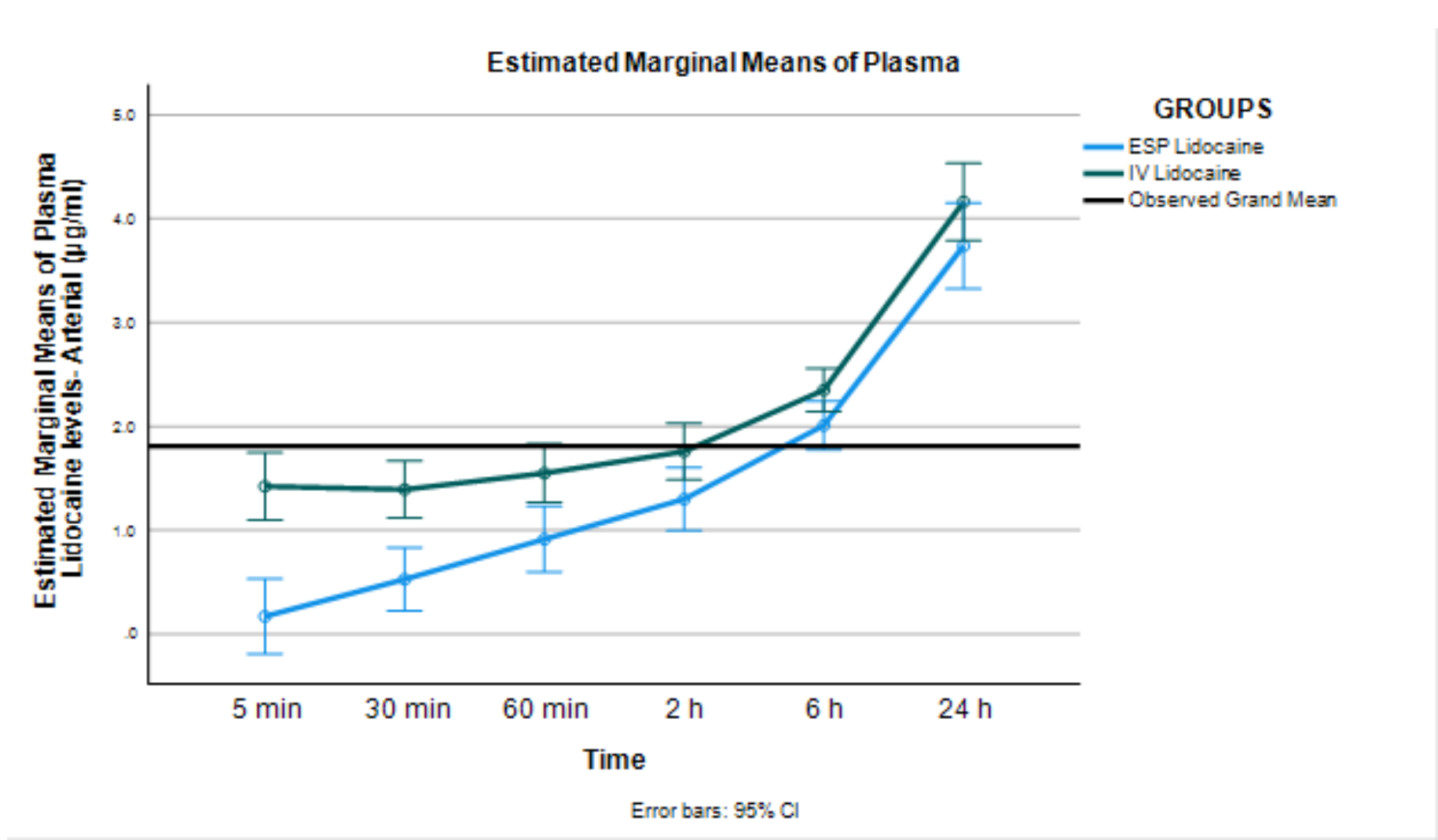


Table.

Variable	ESP (N=27)	IV-Lidocaine (n=34)	Mean/ proportional difference (95%CI)	p-value (Sig <0.05)
Pain Score at 24 postoperative hours (NRS 0-10) Mean (SD)	3.22 (±1.93)	3.93 (±2.21)	-0.71 (-1.87; 0.44)	0.221
Pain Score at 48 postoperative hours (NRS 0-10) Mean (SD)	1.00 (±1.09)	1.71 (±1.94)	-0.70 (-1.68; 0.26)	0.150
Opioid consumption 0-24h (MME)	51.14 (31.93)	42.04 (37.80)	9.10 (-9.08; 27.30)	0.320
Opioid consumption 24-48h (MME)	40.88 (35.47)	31.02 (36.77)	9.86 (-8.74; 28.47)	0.293
Opioid consumption 48-72h (MME)	18.24 (24.73)	22.34 (33.69)	-4.10 (-19.08; 10.88)	0.586
Cumulative opioid usage in the first 48 hours (MME) Mean (SD)	90.13 (±60.15)	71.82 (±59.0)	18.31 (-12.49; 49.12)	0.239
Plasma Lidocaine at 5 min (mcg/ml) Median (IQR)	0.00 (0.00)	1.4 (1.8)	-1.19 (-1.63; -0.74)	<0.001
Plasma Lidocaine at 30 min (mcg/ml) Median (IQR)	0.00 (0.00)	1.5 (0.5)	-0.82 (-1.19; -0.44)	<0.001
Plasma Lidocaine at 60 min (mcg/ml) Median (IQR)	0.00 (0.0)	1.6 (0.6)	-0.74 (-1.12; -0.36)	0.002
Plasma Lidocaine at 120 min (mcg/ml) Median (IQR)	0.00 (0.0)	1.7 (0.8)	-0.46 (-0.82; -0.09)	0.034
Plasma Lidocaine at 6 h (mcg/ml) Mean (SD)	2.01 (±0.57)	2.32 (±0.47)	-0.31 (-0.59; -0.03)	0.042
Plasma Lidocaine at 24h (mcg/ml) Mean (SD)	3.83 (±0.90)	4.07 (±0.96)	-0.23 (-0.74; 0.26)	0.352

