

Summary of the results from the study "Comparison between articaine and lidocaine regional anaesthesia in patients undergoing bone marrow biopsy" (EudraCT number 2006-005195-40)

Aim of the study: This randomized, double blind study compared articaine, a local anaesthetic able to penetrate bone tissue, with lidocaine during bone marrow aspiration and biopsy.

Patients and methods: The study was performed at Helsinki and Uusimaa district Meilahti hospital haematology outpatient clinic. Predetermined exclusion criteria were allergy to lidocaine or articaine, body mass index over 32 kg/m², unstable coronary artery disease and inability to communicate in Finnish or Swedish.

After giving informed consent, 150 adult patients with suspected or known haematologic disease were randomized to receive local infiltration anaesthesia either with articaine 20 mg/ml (50 patients), articaine 40 mg/ml (49 patients) or lidocaine 20 mg/ml (51 patients), all with adrenaline 5 µg/ml. The local anaesthetic was infiltrated in volume of 6 ml (sternal manubrium), 8 ml (sternal body) or 10 ml (iliac crest) 2 minutes before bone marrow puncture. If anaesthesia was not adequate for the insertion of the aspiration needle, half of the initially used amount was administered for the second infiltration.

The primary outcome of the study was pain in NRS (Numeral Rating Scale, 0-10) during local anaesthetic infiltration, at puncture, at aspiration and at biopsy. Secondary outcome was preprocedural anxiety rated with a verbal scale 0-4, where 0 = no anxiety and 4 = very anxious.

Patients were interviewed 30 minutes after the procedure and the pain scores were recorded. The patients were also interviewed by telephone 24 hours and 2 weeks after the procedure to provide information of their general condition, possible side effects and need of pain medication.

The study sample size was based on power calculation. The demographic data was analyzed using ANOVA and nonparametric data with non-parametric tests including Kruskal–Wallis and Mann–Whitney U. Spearman Rank correlation was used with parametric data. Hospital ethics committee approved the study before patient recruitment.

Main results: Numeral Rating Scale scale (median, range) at injection of local anaesthetic was 3.0 (0–10), at puncture 2.0 (0–8), at aspiration 3.5 (0–10) and at biopsy (48 patients) 3.0 (0–10). Pre-procedural anxiety correlated significantly with experienced pain ($P < 0.01$). Very anxious patients had had fewer previous bone marrow examinations ($P < 0.01$) and they experienced more pain during aspiration ($P < 0.05$). In the post-interview, 42 patients reported appearance of pain (median 2.0, range 1–7) after 6.2 hours, on average, and 15 patients needed oral analgesics. No parameter differed significantly between the groups.

Conclusion: The quality of infiltration anaesthesia for bone marrow puncture and aspiration with articaine and lidocaine was similar. Several patients experienced strong pain which correlated with the degree of anxiety.

The results were published in the following research article:
Kuivalainen AM, Niemi-Murola L, Widenius T, Elonen E, Rosenberg PH: Comparison of articaine and lidocaine for infiltration anaesthesia in patients undergoing bone marrow aspiration and biopsy. *Eur J Pain* 2010;14:160-163.