

Background

Ambulatory and home postoperative analgesia frequently relies on elastomeric pumps, despite known flow variability related to temperature, height and back pressure¹. Modern **electronic ambulatory pumps** offer: Programmable intermittent bolus regimens, Delayed starts, Occlusion and air-in-line alarms, Smart-pump safeguards and error-reduction software to intercept wrong-dose and wrong-rate events^{2–5} Real-world clinician experience with connected electronic systems in outpatient pain management remains limited.

Objective: To evaluate clinician-reported safety, alarm performance, usability, and satisfaction with a **connected** electronic ambulatory infusion pump in outpatient and home settings.

Methods

Device: Avoset® Connected Ambulatory Infusion Pump System (Eitan Medical)

Design: Post-market clinical follow-up (PMCF) structured online survey

Survey Period: Device use evaluated: Jan–Dec 2024

Participants:

- Nurses, physicians, pharmacists
- USA, UK, France
- ≥7 prior device uses

Domains Assessed: Care environment, Infusion modes and routes, Alarm recognition and effectiveness, Perceived accuracy, Adverse events, Connectivity utility and Overall satisfaction

Analysis: Descriptive statistics

Ethics: IRB exempt; anonymous clinician feedback only

Results

Respondents Total: 11: USA: 6, UK: 3, France: 2

Practice Setting Ambulatory/outpatient: 7, Homecare: 4

Infusion Characteristics:

Most Common Modes: Continuous infusion and Patient-controlled analgesia (PCA) with boluses

Routes: Intravenous, Perineural and Subcutaneous

Outcomes: No respondents reported side effects, misuse, or labeling issues.

No reported alarm failures or dosing inaccuracies across 11 clinicians in 3 countries.

Alarms were effective in drawing attention of user for troubleshooting e.g. resolving line kinks resulting in occlusion alarm for the six clinicians that experienced an alarm. Connectivity was found to be helpful for remote troubleshooting though a minor number of login-related events were noted.

Discussion

Connected electronic ambulatory infusion pumps may provide: Enhanced safety compared with elastomeric systems. Real-time alarms for troubleshooting, improved dosing consistency and remote troubleshooting capability with Eitan Insights® Platform. These features may support improved workflow and potentially better clinical outcomes in outpatient regional anesthesia. Larger, comparative studies are warranted.

Limitations

Small sample size (n=11), no direct comparison group, no patient-reported outcomes, only clinician feedback.

References:

1) Capdevila X, Macaire P, Aknin P, et al. Patient-Controlled Perineural Analgesia After Ambulatory Orthopedic Surgery: A Comparison of Electronic Versus Elastomeric Pumps. Anesth Analg. 2003;96(2):414–417. DOI: 10.1213/00000539-200302000 00022 2) Finneran JJ, Said ET, Curran BP, et al. Basal Infusion versus Automated Boluses and a Delayed Start Timer for "Continuous" Sciatic Nerve Blocks after Ambulatory Foot and Ankle Surgery: A Randomized Clinical Trial. Anesthesiology. 2022;136(6):970–982. doi:10.1097/ALN.0000000000004189 3) Ohashi K, Dalleur O, Dykes PC, Bates DW. Benefits and risks of using smart pumps to reduce medication error rates: a systematic review. Drug Saf. 2014;37(12):1011–1020. doi:10.1007/s40264-014-0232-1 4) Grote D, Zeitz J, Sorrels C, et al. Effect of programmed intermittent epidural bolus protocol on physician-administered rescue boluses of labor analgesia. Baylor Univ Med Cent Proc. 2023;36(6):687–691. doi:10.1080/08998280.2023.2254201 5) Ilfeld BM. Continuous Peripheral Nerve Blocks: An Update of the Published Evidence and Comparison With Novel, Alternative Analgesic Modalities. Anesth Analg. 2017;124(1):308–335. doi:10.1213/ANE.0000000000001581

Clinician-Reported Safety, Alarm Performance, and Usability of a Connected Ambulatory Infusion Pump: A Multi-Country Survey

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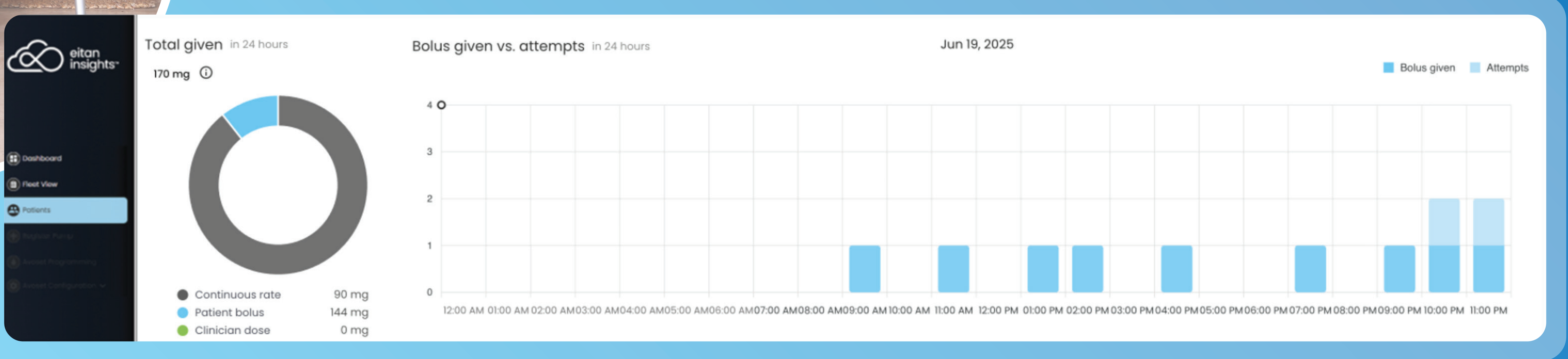


Conclusions

Clinicians across three countries reported:

- Effective alarm performance
- Favorable usability
- High perceived safety
- Workflow benefits from connectivity

Connected electronic ambulatory infusion pumps represent a promising alternative to elastomeric systems in outpatient pain management.



Eitan Insights® platform remotely presenting PCA bolus attempts data sent from Avoset® Infusion pump

