

A Service Evaluation into the Use of Intranasal (IN) Ketamine and Fentanyl Within Yorkshire Ambulance Service's (YAS) Helicopter Emergency Medical Service (HEMS)

Aims

Primary Objective:

Explore the utilisation of IN ketamine and fentanyl within YAS HEMS, via qualitative and quantitative data analysis, to inform future pain management strategies within this service and promote discussion of IN analgesic usage in wider paramedic practice.

Secondary Objectives:

1. Establish the frequency of IN ketamine and fentanyl use by YAS HEMS practitioners between 21/01/2018 and 31/08/2020.
2. Determine which IN analgesic was used more frequently.
3. Explore any patient and practitioner factors which impacted the use and choice of IN analgesia by YAS HEMS practitioners.
4. Document the occurrence and impact of any IN ketamine/fentanyl adverse effects experienced by YAS HEMS practitioners.

Background

1. Acute pain is an uncontrollable consequence of many injuries and illnesses, especially in the major trauma patient population attended to by HEMS clinicians.
2. Managing pain early and effectively is known to improve patient clinical outcomes and satisfaction (1,2) and is increasingly viewed as a fundamental human right (3).
3. The Royal college of Emergency Medicine recommends that pain-alleviation should be a priority during treatment, in all areas of emergency medicine (4). Despite this recommendation, literature has shown prehospital pain-relief to be suboptimal, particularly in trauma and paediatric patients (5-8).
4. Analgesia is commonly administered intravenously (IV) by HEMS teams, however difficulty obtaining venous access is a common barrier. Other IV access difficulties may stem from prehospital clinicians commonly treating cold or shocked patients, sometimes in difficult, hard to access locations (8).
5. As a fast, non-invasive and well-tolerated route of administration, IN analgesia is gaining increasing traction as a method of tackling oligoanalgesia.
6. Two available IN analgesics to many HEMS teams are IN ketamine and IN fentanyl, however little literature is available surrounding their use in British emergency medical services. This service evaluation aims to begin bridging this gap to help inform future prehospital pain-relief practice.

Methods

Mixed methods design:

Quantitative Data	Qualitative Data
Study Population 1 23 YAS HEMS patients given IN ketamine or fentanyl between 21/01/2018 and 31/08/2020.	Study Population 2 Six YAS HEMS clinicians qualified to give IN ketamine and fentanyl.
Inclusion Criteria • Treated by YAS HEMS team between the dates 21/01/2018 and 31/08/2020. • Been prescribed and administered IN Ketamine, IN fentanyl or both by a YAS HEMS practitioner.	Inclusion Criteria • A clinician with YAS. • Working/worked on Yorkshire Air Ambulance. • Able to prescribe and administer IN ketamine and IN fentanyl.
Data Collection 23 anonymised patient cases, from study population 1, were extracted from YAS records by trained YAS staff, using a proforma of predetermined variables and inclusion criteria.	Data Collection Field notes were written during semi-structured interviews, conducted over video calls with clinicians from study population 2. Interviewees were selected via voluntary sampling.
Data Analysis Descriptive statistic calculations were completed using Microsoft Excel.	Data Analysis Open coding was employed using Braun and Clarke's six step thematic analysis model.

Qualitative Results

Against IN analgesia:

"In situations where cannulation is doable, I would always go for it - Air ambulance patients usually need a cannula for other reasons too, like fluid or blood" (Participant 4)

Preference between the IN agents:

"For purely analgesia I would always go for fentanyl" (Participant 1)

"Ketamine is preferred for dynamic pain and injuries requiring manipulation" (Participant 4)

"Fentanyl is good for burns and scalds" (Participant 5)

Opinions on wider use of IN ketamine and fentanyl:

"In the right patients [IN] is very good, it's a shame our paramedic colleagues can't carry [IN] fentanyl" (Participant 2)

"I would recommend wider usage, but participants need appropriate training in both administration and in managing potential side-effects" (Participant 5)

In favour of IN analgesia:

"Good where you want rapid analgesia and sedation before a cannula can be inserted" (Participant 3)

"IN is effective particularly in young kids" (Participant 3)

Factors affecting IN use:

"Mainly in paediatric patients – fractured legs or trauma; Nasty upper/lower limb fracture where you want rapid analgesia or sedation before a cannula can be inserted" (Participant 2)

"Ease of IV access is the predominant factor in deciding to use IN" (Participant 5)

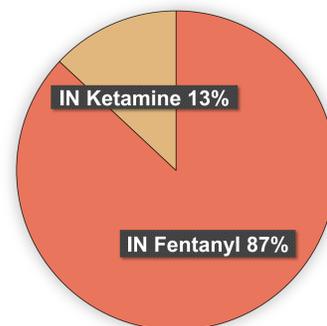
Side-effects:

"IN analgesia is safer as it has less pronounced side-effects" (Participant 1)

"I wouldn't use ketamine in an uncontrolled environment due to risk of re-emergence phenomenon" (Participant 6)

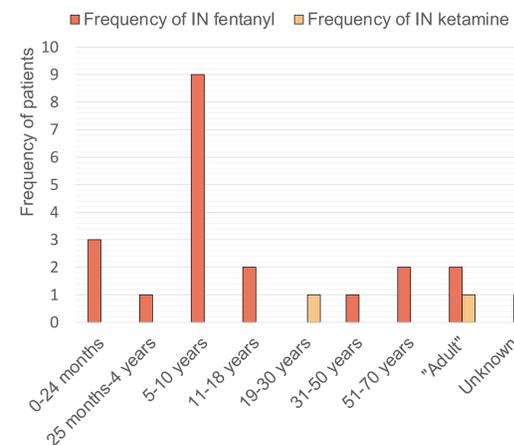
Quantitative Results

Which IN agent was used more frequently?

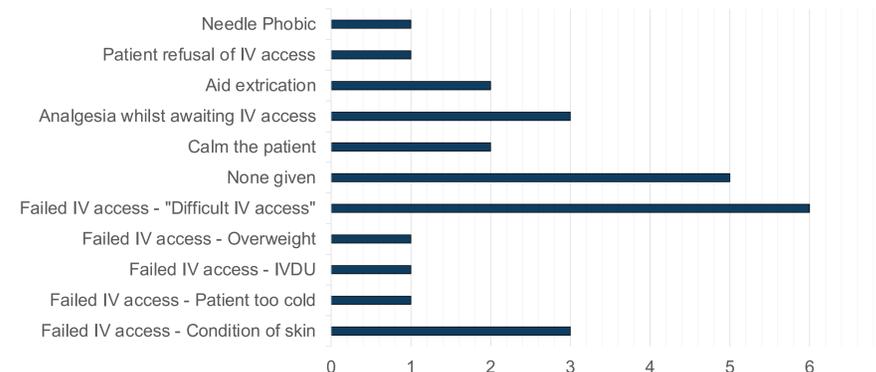


n = 23, IN fentanyl = 20, IN ketamine = 3

IN ketamine and IN fentanyl use by age



Reasons documented for IN fentanyl/ketamine use by HEMS physicians



Discussion

1. IN was considered effective, in the right scenarios. However, the frequency of use is low by YAS HEMS team – only used in 23 cases in 20 months.
2. YAS HEMS clinicians are more familiar and confident in using IN fentanyl, the quantitative data supports IN fentanyl is used more frequently than IN ketamine.
3. IN is particularly useful in children and patients with poor IV access.
4. Background of the clinician responsible for IN analgesia was deemed a relevant factor impacting use and choice in 5/6 interviews.
5. All clinicians supported wider usage. However, all concluded that extra training would be required to learn administration technique and side effect management.
6. IN may be a useful stopgap that can facilitate easier IV insertion and it helps avoid the more invasive IO approach.

Take Home Messages

IN analgesia was considered a safe and effective option for prehospital pain relief.

Clinicians overall favoured fentanyl over ketamine mainly due to familiarity.

All clinicians supported the wider dissemination of IN analgesia with appropriate training.



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