Oral transmucosal fentanyl citrate analgesia in prehospital trauma care: an observational cohort study

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Study aims and background

Pain is one of the major prehospital symptoms in trauma patients and requires prompt management.

Recent studies have reported insufficient analgesia after prehospital treatment in up to 43% of trauma patients, leaving significant room for improvement. Good evidence exists for prehospital use of oral transmucosal fentanyl citrate (OTFC) in the military setting.

We hypothesized that the use of OTFC for trauma patients in remote and challenging environment is feasible, efficient, safe, and might be an alternative to nasal and intravenous applications.

Methods

This observational cohort study examined 177 patients who were treated with oral transmucosal fentanyl citrate by EMS providers in three ski and bike resorts in Switzerland. All EMS providers had previously been trained in administration of the drug and handling of potential adverse events

Results

OTFC caused a statistically significant and clinically relevant decrease in the level of pain by a median of 3 (IQR 2 to 4) in NRS units (P<0.0001).
Multiple linear regression analysis showed a significant absolute reduction in pain, with no differences in all age groups and between genders.
No major adverse events were observed.

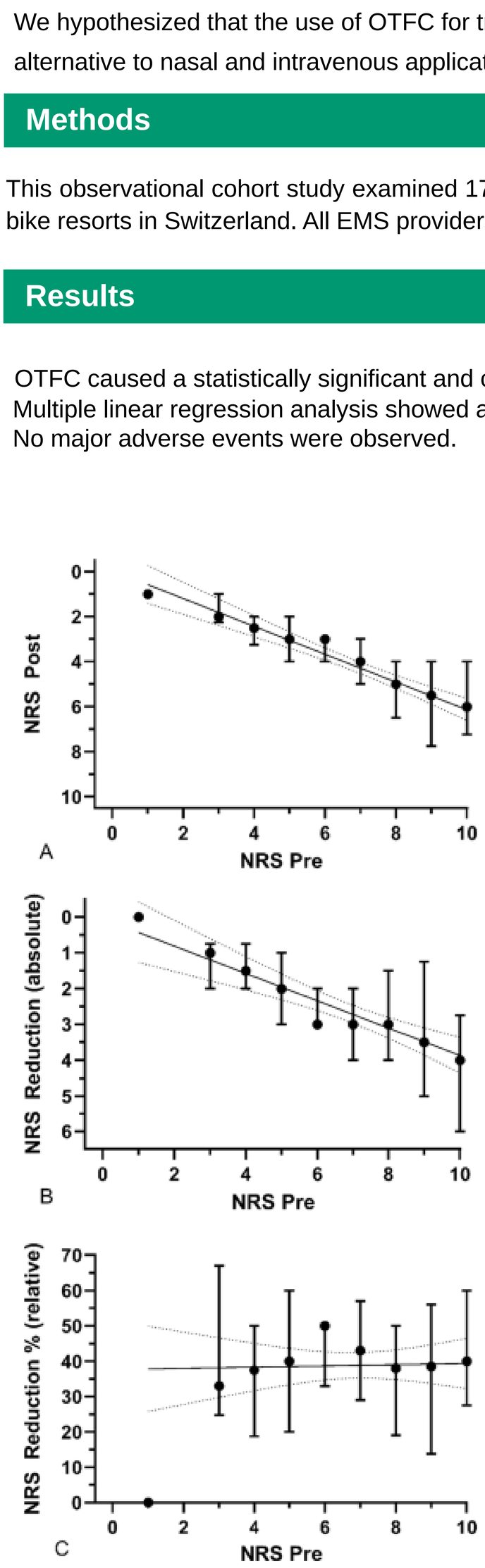
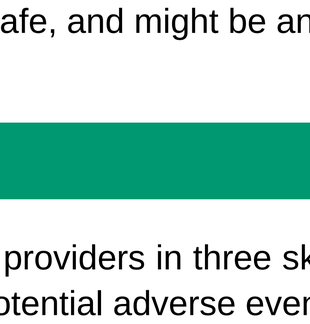


Fig 1 Distribution of absolute and relative reduction depending on pain level

Graph A shows the pain level before and after administering OTFC. Graph B includes the absolute reduction depending on pain level before OTFC. Moreover, the effect of higher efficiency with higher NRS when administering fentanyl can be seen in both. Graph C includes the relative reduction in percentage. Here, we were able to show equal pain reduction depending on the initial pain level, with an average just below 40%.



Tab 1. Pain reduction in different subgroups

Subgroup	NRS initial, n (IQR)	NRS after OTFC, n (IQR)	NRS Reduction absolute, n (IQR)	Pain Reduction Percentage (SD)	*P* value
Men	7 (6–8)	4 (3–6)	3 (2–4)	39.8% (24.6%)	*P* < 0.0001
Women	7 (5–8)	4 (3–5)	2 (1–3)	37.4% (23.6%)	*P* < 0.0001
Age < 20	7 (6–8)	4 (3–5)	3 (2–4)	43.8% (26.9%)	*P* < 0.0001
Age 20–60	7 (5.25–8)	4 (3–5.75)	2 (1–4)	38.1% (23%)	*P* < 0.0001
Age > 60	7 (5.75–9)	5 (3–7.25)	2.5 (1–4)	34.5% (26.6%)	*P* < 0.0001
Upper Extremities	7 (6–8)	4 (3–6)	2 (1.75–4)	36.7% (22.4%)	*P* < 0.0001
Lower Extremities	7 (5–8)	4 (2–5)	3 (1–4)	39.8% (26.2%)	*P* < 0.0001
Thorax, Abdomen and Spine	7 (6–8)	3 (3–5.5)	3 (2–5)	45.7% (25%)	*P* < 0.001

Absolute pain reduction in all subgroups was around 40%, showing an efficient analgetic effect of OTFC on a broad range of patients. The subgroups of injuries in the thorax, abdomen and the spinal column combined due to small case load each. Additionally, we could show that absolute reduction in pain (expressed in NRS) was directly proportional to the initial pain level (see Fig. 1, Graph A to C), whereas the relative reduction in pain (expressed in % of initial NRS) was stable throughout the initial intensity of pain

IQR inter-quartile range, *SD* standard deviation, *P* significant < 0.05

Conclusions

Prehospital OTFC administered in a hostile alpine environment is safe, easy, and efficient for different types of injuries, means of extrication and transport in all age groups and gender; side effects were few and mild. This could provide a valuable alternative without the delay of an intravenous line in trauma patients with severe pain, especially in remote areas, where fast action and easy administration are important.

https://sjtrem.biomedcentral.com/articles/10.1186/s13049-023-01066-0#citeas