

The impact of BMI on post op pain scores when using morphine analgesia



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10 August 2019

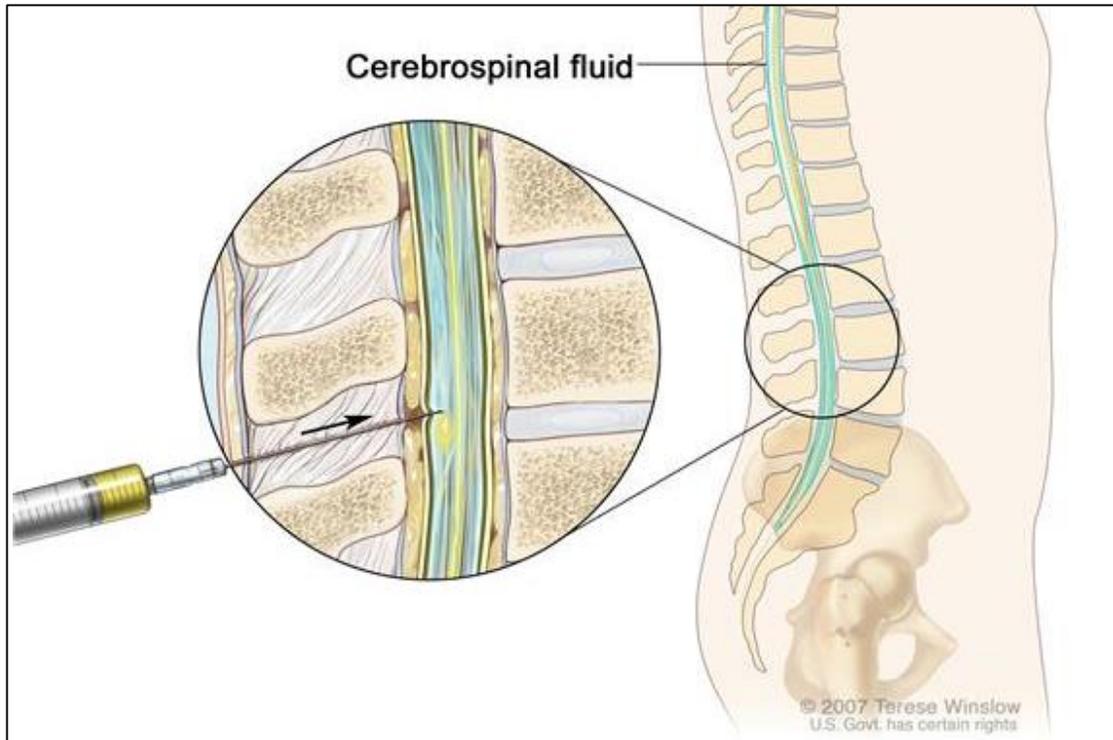


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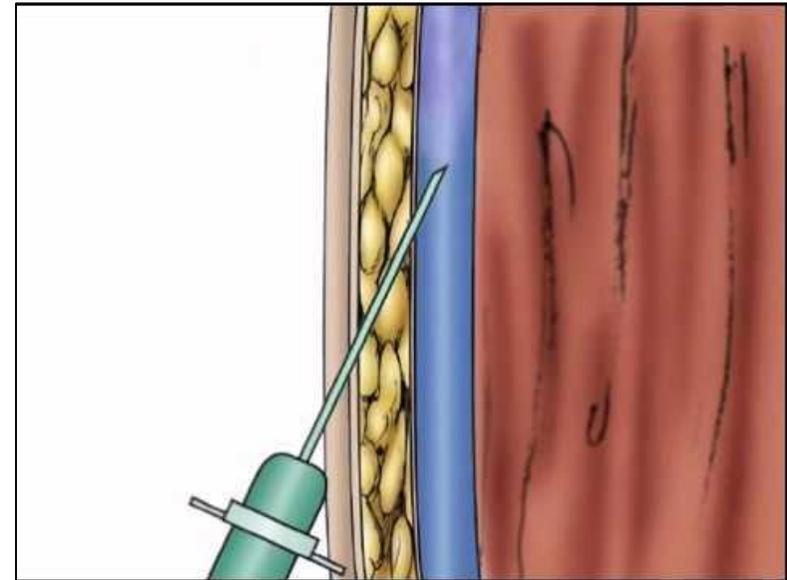


Hypothesis

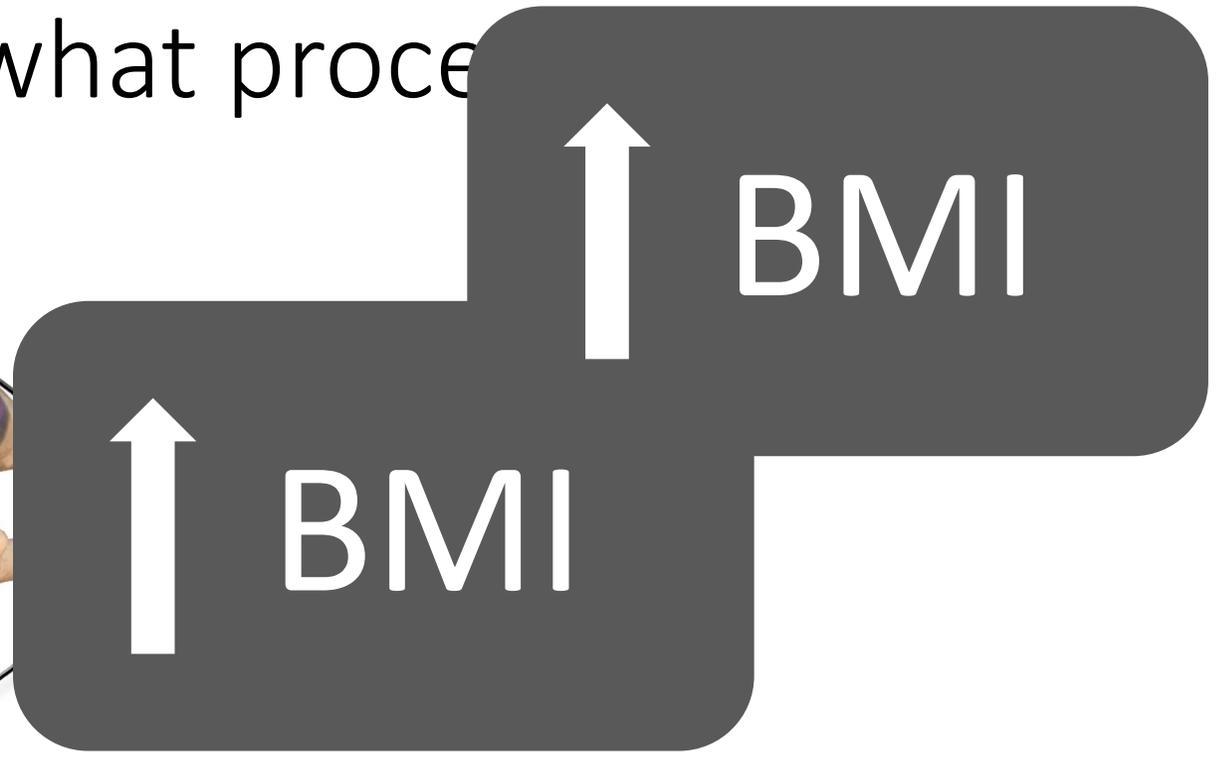
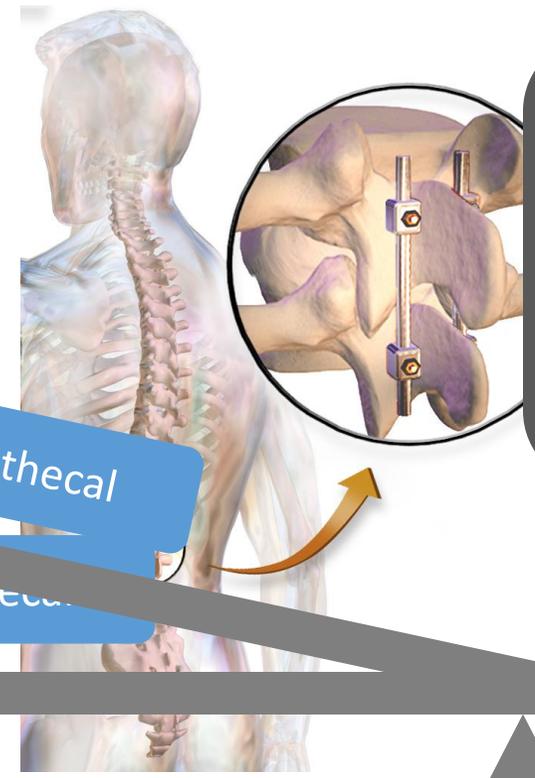
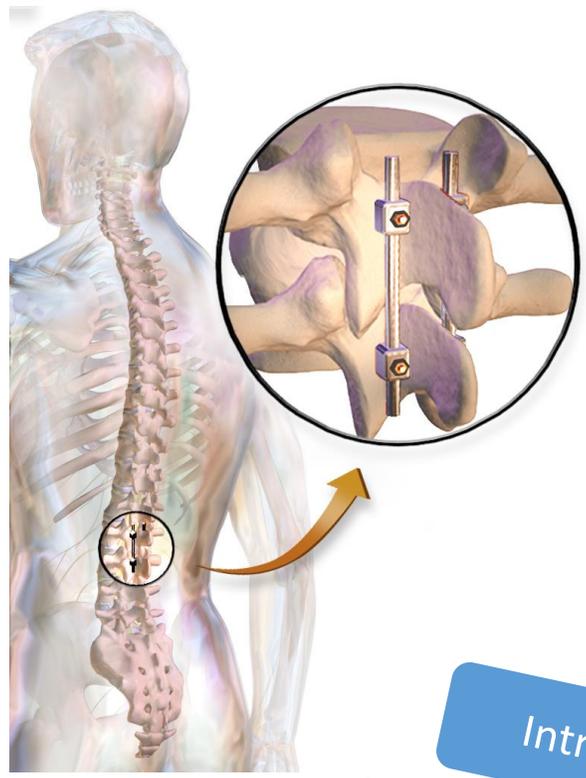
If morphine is administered intrathecally, will it be more efficient than intravenous morphine in the obese patient?



VS



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What makes the intrathecal route more effective?

Intrinsic properties of morphine

Upregulation of μ -receptors in inflammation

Patient factors associated with increased BMI

Morphine

Potent analgesic

Works on μ -receptors in central nervous system

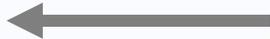
If dosage incorrect (too high) a risk exist for respiratory depression

Both lipo- and **hydrophilic**

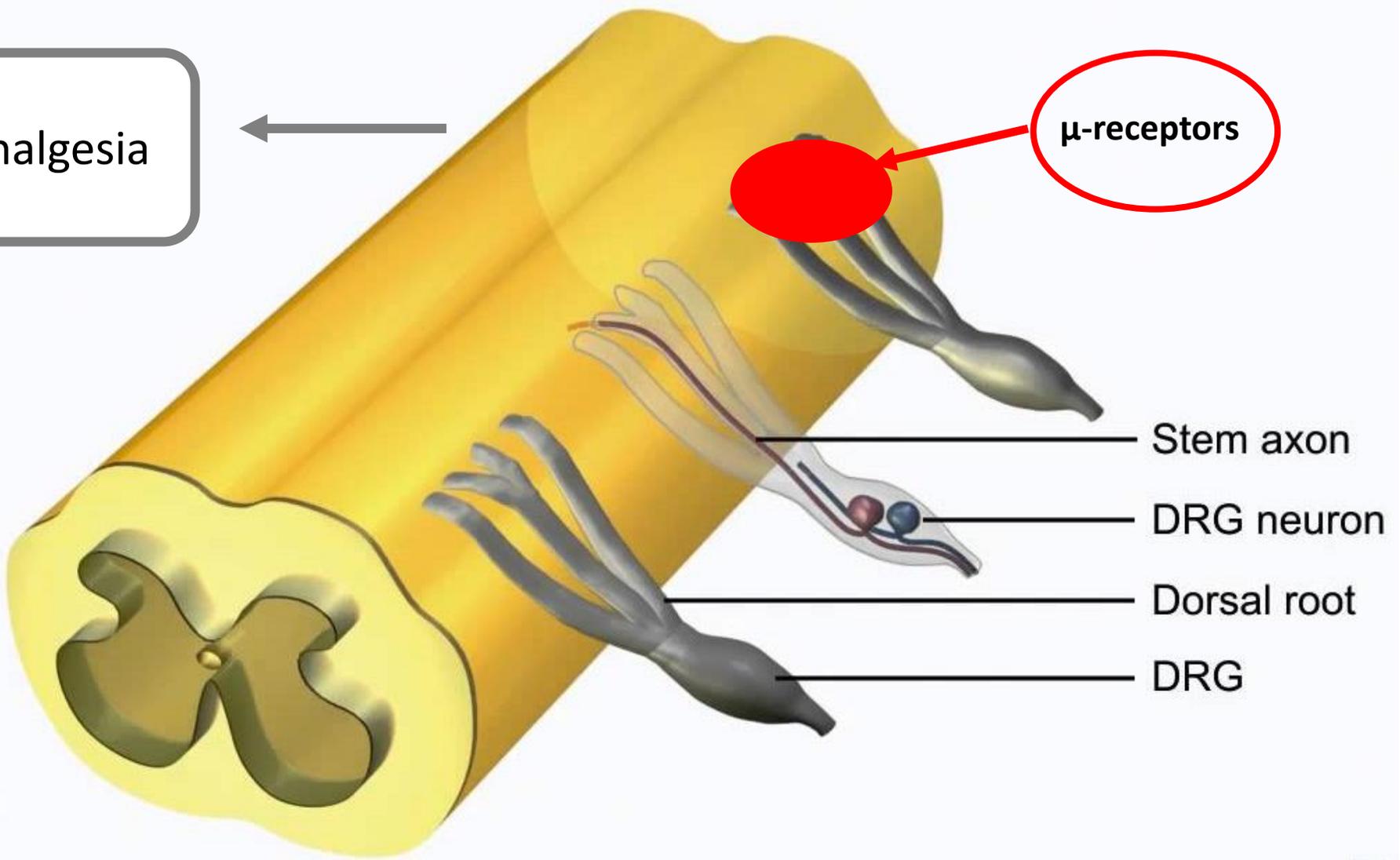
Needs to cross BBB (Lipids)



Segmental analgesia



μ -receptors



Pharmacokinetics

Increased adipose tissue

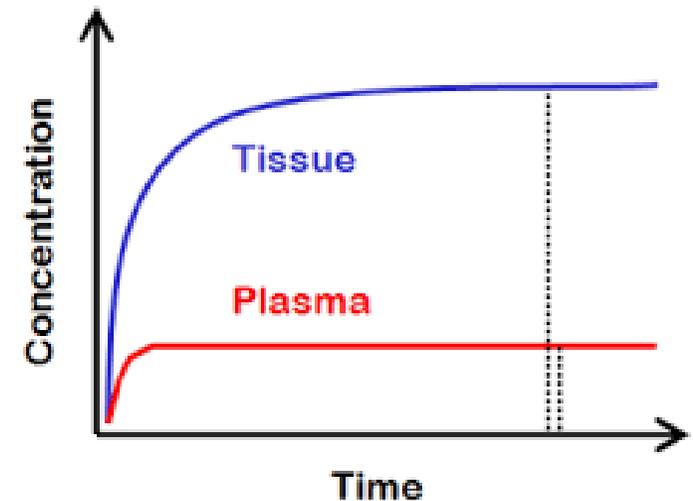
Increase blood volume and cardiac output

Decreased clearance of morphine metabolites in obesity

Increased exposure

Volume of distribution (V_D)

degree to which drug is distributed to body tissues instead of just plasma



Pharmacokinetics

V_D for morphine = 2-5 L/kg body weight

distributed throughout body tissues not just plasma or extracellular fluid

V_D changes with increasing BMI

Unclear effect on morphine distribution

Intrathecal administration potentially reduces these challenges

Obesity

Abnormal accumulation of fat in excess of
20% of normal body weight **BMI > 30**

Rising global prevalence of obesity

Worldwide obesity has nearly tripled since 1975

In 2016 the WHO estimated that **28.3%** of South Africans were obese

Classified as a disease ICD-10 E66.0

Common and increasing patient demographic

Problematic because more adverse events when using opioids



* Agha M, Agha R. The rising prevalence of obesity: part A: impact on public health. International Journal of Surgery Oncology (2017) 2:e17

Obesity adverse events

Sleep Apnoea Syndrome (60 – 90% obese patients)

Smaller total pharyngeal area due to adipose tissue deposition

Opioids diminish the action of pharyngeal dilator muscles

Promoting collapse

Added **mechanical obstruction** due to poor ventilatory effort

Reduced response to hypoxaemia and hypercapnia

Chest bulk

Risk of 25th hour apnoea



Methods

Prospective double blind randomised controlled study

PCA morphine (1mg / kg) vs intrathecal morphine **0.005mg / kg** (to a maximum of 450mcg)

Height, weight, total body water, muscle, bone, fat measured

Standardised anaesthetic (Remifentanyl based)

Perfalgan for 48 hours

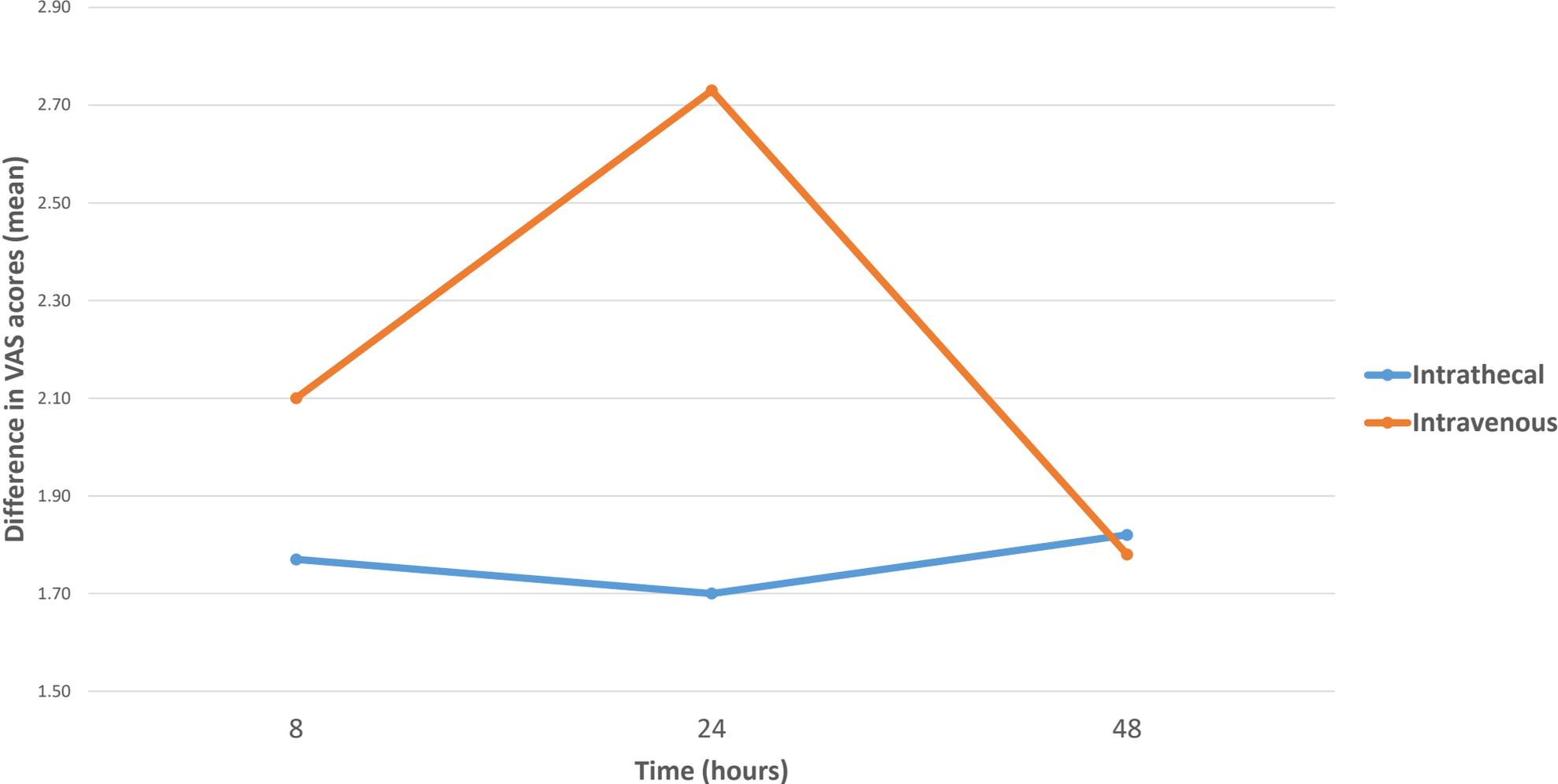
VAS at 8, 24 and 48 hours

VAS lying still and moving

Difference in VAS



IT vs IV VAS scores



Results

- Adverse events
 - No respiratory side effects (serial ABG's)(OISS)
 - No CSF leaks
 - 2 patients complained of headache
 - No morphine related side effects (itching, nausea and vomiting)

Discussion

- In obese patients an undetermined portion of IV dose is lost into the adipose tissue reducing the immediate analgesic effect
- Increasing the dose to achieve required analgesic effect increases the risk of adverse events
- Giving intrathecal morphine results in maximum analgesic effect with minimal side effect profile
- Much smaller doses are required

Discussion

- Better pain control over the first 48 hours allows for quicker mobilization
- Earlier mobilization allows for earlier discharge



Conclusion

- Intrathecal morphine is a **safe** and **effective** means of providing post operative analgesia
- In obese patients intrathecal morphine showed **improved efficacy** and should be considered over intravenous administration when morphine is the desired analgesic

References

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