

Heating Up: Using a Heat Map to Reflect Sensory Change Distribution of Subcostal TAP and Rectus Sheath Blocks



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Introduction

- There is no consensus on the optimal regional analgesic technique for upper abdominal surgery.
- Aiming to anesthetize thoracolumbar nerves T6-T10, it has been postulated that transversus abdominis plane (TAP) blocks are an effective alternative to thoracic epidural analgesia.
- This study attempted to more accurately define anesthetic dermatomal coverage of subcostal TAP and rectus sheath blocks by formally mapping analgesic coverage.

Materials & Methods

- Prospective study conducted at the University of Minnesota Medical Center (IRB#00008472)
- Patients received a combination of ultrasound-guided subcostal TAP and rectus sheath blocks preoperatively through a single needle puncture bilaterally.
- 15 mL of 0.25% bupivacaine with 0.5 mg of dexamethasone and 10 mcg of dexmedetomidine was deposited between the transversus abdominis muscle and the posterior rectus sheath. An additional 15 mL was injected in the rectus sheath plane. This was repeated on the contralateral side.
- Assessment of sensory blockade was performed with ice at 15 and 30 minutes post-block, and immediately postoperatively; marking areas of sensory transition.
- Images were acquired of each patient's abdomen, with a superimposed transparent grid. Collected sensory data from each patient was transferred to an excel spreadsheet, using a "1" for a reduction in sensation and a "0" for normal sensation, then aggregated.
- Using <http://heatmapper.ca/>, a generic photo of an abdomen and superimposed grid was uploaded and the aggregated scoring was entered into the heatmap table for both the 15 and 30 minute increments reflective of sensory coverage.

Time Elapsed: 15 Minutes

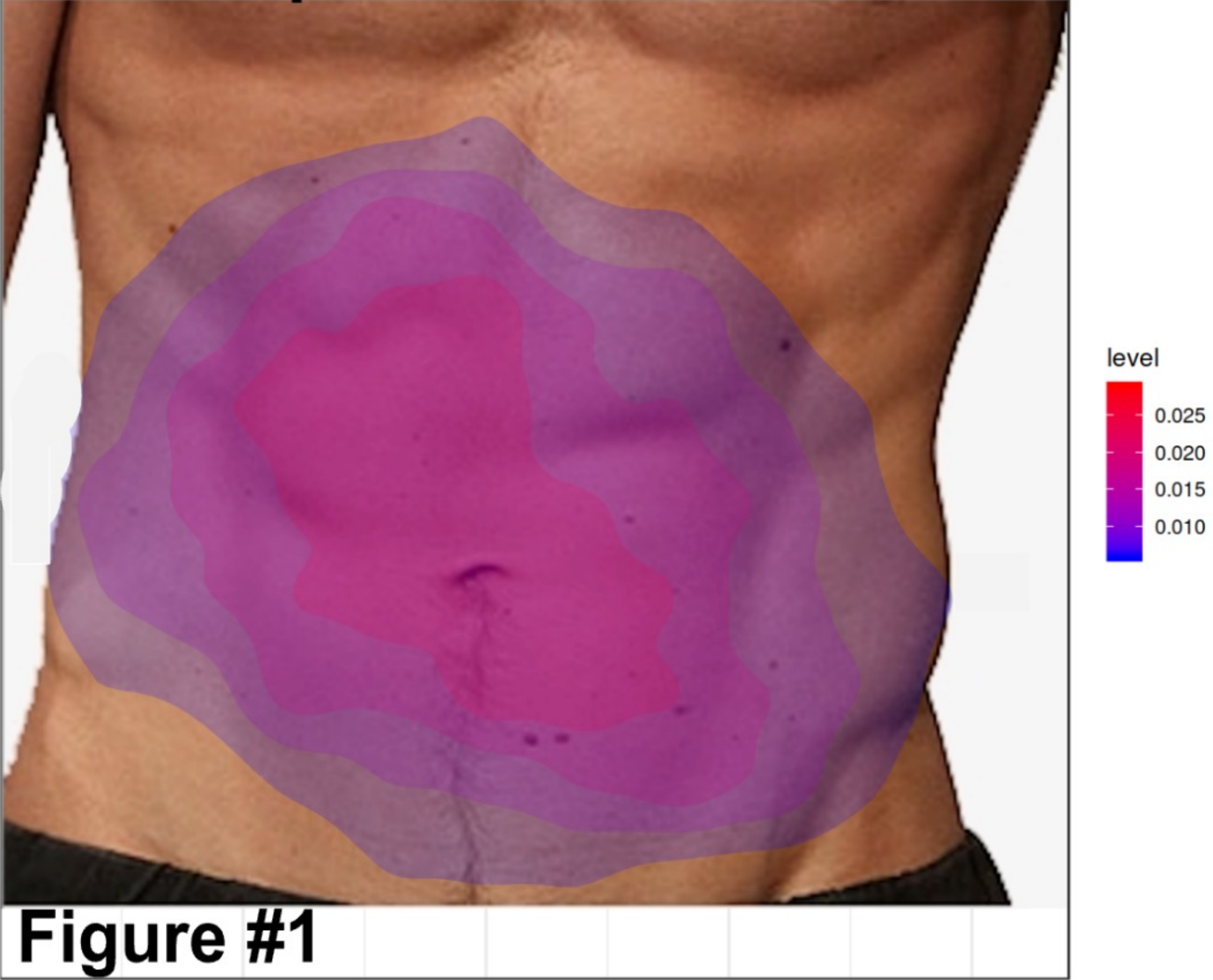


Figure #1 showing sensory distribution change after 15 minutes

Time Elapsed: 30 Minutes

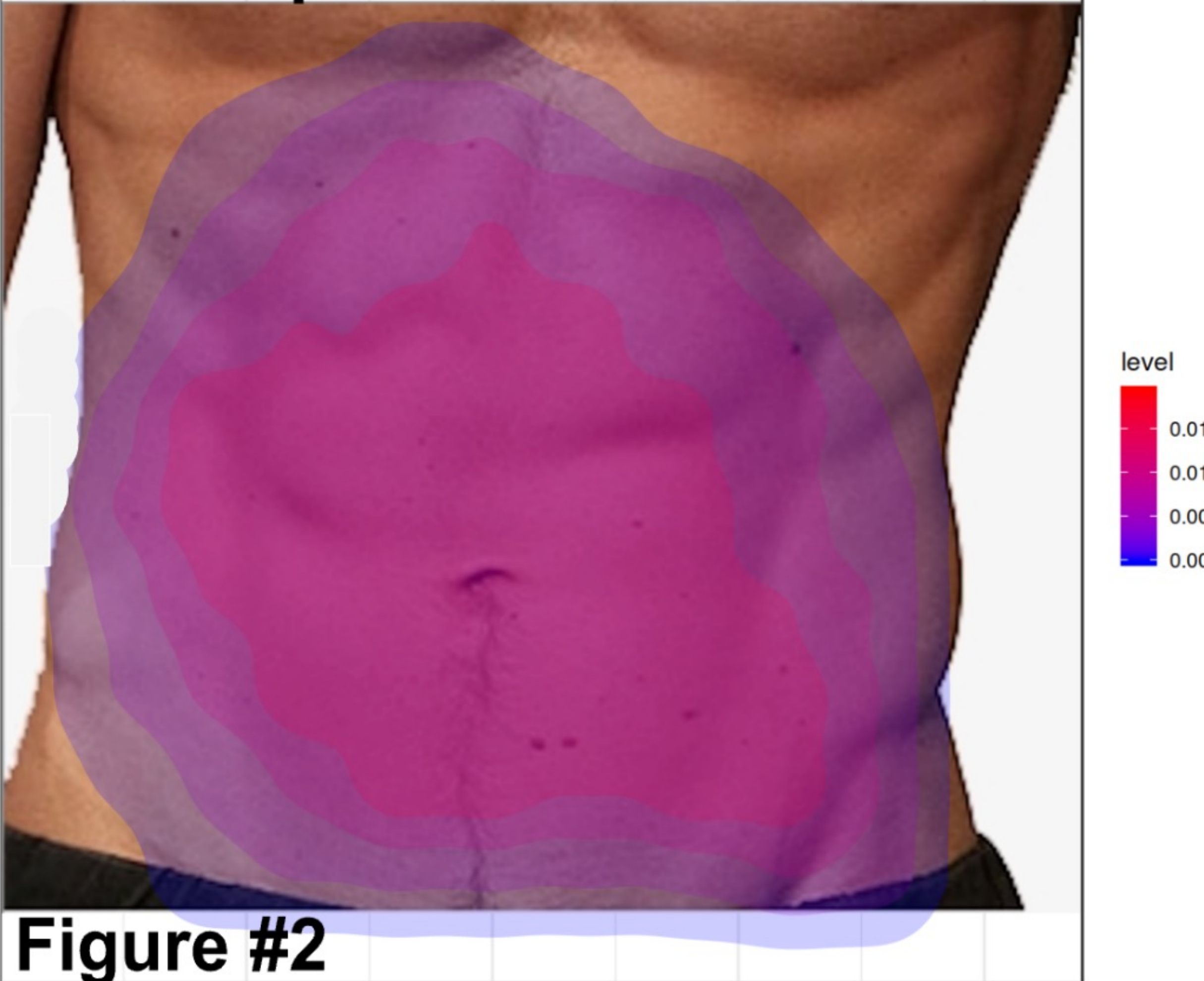


Figure #2 showing sensory distribution change after 30 minutes

Results

- 6 enrolled, 1 excluded for poor image quality, 5 analyzed.
- Sensory spread at 15 and 30 minutes following administration are noted in Fig #1 & #2, respectively
- At 30 minutes there is more uniformity of spread surrounding the umbilicus compared to 15 minutes

Conclusions & Discussion

- Primary Goal: to accurately and visually depict the coverage of the combination of a subcostal TAP and rectus sheath blocks.
- Historically, nerve block coverage has been described via dermatomes & visualized by dye cadaver and imaging studies.
- We wanted to provide medically & non-medically trained individuals with a more complete understanding of what to expect from a nerve block.
- Utilizing a heat map allows individuals to understand and appreciate the expected effects of a nerve block procedure, benefiting both proceduralist and patient understanding of its coverage.
- This highlights variability of fascial plane blocks.
- We believe that this method should be expanded to other fascial plane blocks and built upon to better allow for selection of the best block for an individual patient and allow future research in fascial plane blocks to be more standardized.

References

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