

Laboring Epidural Analgesia with Compu-Flo: Analyzing Correlation of Ligamentum Flavum and Epidural Pressures with Epidural Success

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Abstract

Placement of laboring epidural analgesia (LEA) in parturient patients traditionally relies on tactile sensation. Unique patient anatomy and higher BMI are among several factors that may cause neuraxial placement to be challenging. The Compu-Flo is an apparatus designed to facilitate a more precise, reliable and effective application of epidural anesthesia to determine accuracy of each layer passed by measuring pressure at the end of the needle.

In our study, we used the Compu-Flo to place LEA in patients. We achieved a 92% epidural success rate in our study, requiring zero re-direction and replacement in nearly every study subject. We measure the average pressures in the ligamentum flavum and epidural space during a successful epidural placement to analyze a correlation with age and BMI. Our data shows that the average ligamentum flavum pressure (LFP) in a successful epidural is 135.4 mmHg. There is no correlation between LFP and age of the patient. There is a negative correlation -- although statistically insignificant -- between LFP and BMI.

The average epidural space pressure (ESP) measured in a successful epidural is 46.3 mmHg. There is no correlation between ESP and the age of the patient. There is no correlation between ESP and BMI of the patient.

Conclusion

In conclusion, our data supports that the Compu-Flo is a precise technique to facilitate accurate placement of LEA. There is approximately >/ 50 mmHg of pressure delineating between ligamentum and epidural space, and the Compu-Flo proves this. Regardless of patient age or BMI, the pressures of ligamentum flavum and epidural space are within the same range for our patients. This further supports that by utilizing the Compu-Flo technique, many patients –irrespective of age or BMI -- can have a precise and effective epidural to improve cost of care by improving patient morbidity, decreasing multiple LEA attempts, and improving the accuracy of a safe and effective epidural for the patient.

References

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Discussion

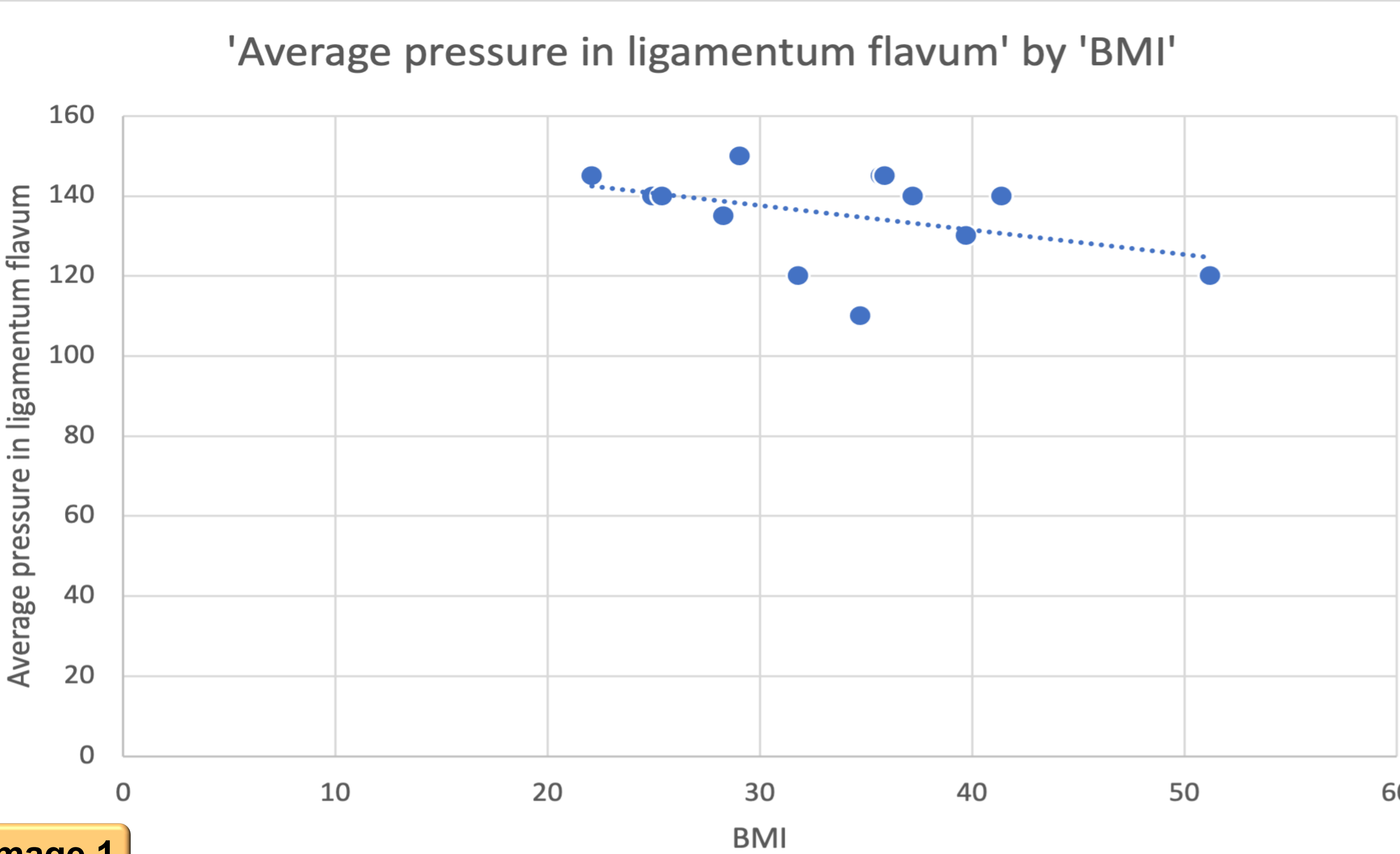


Image 1

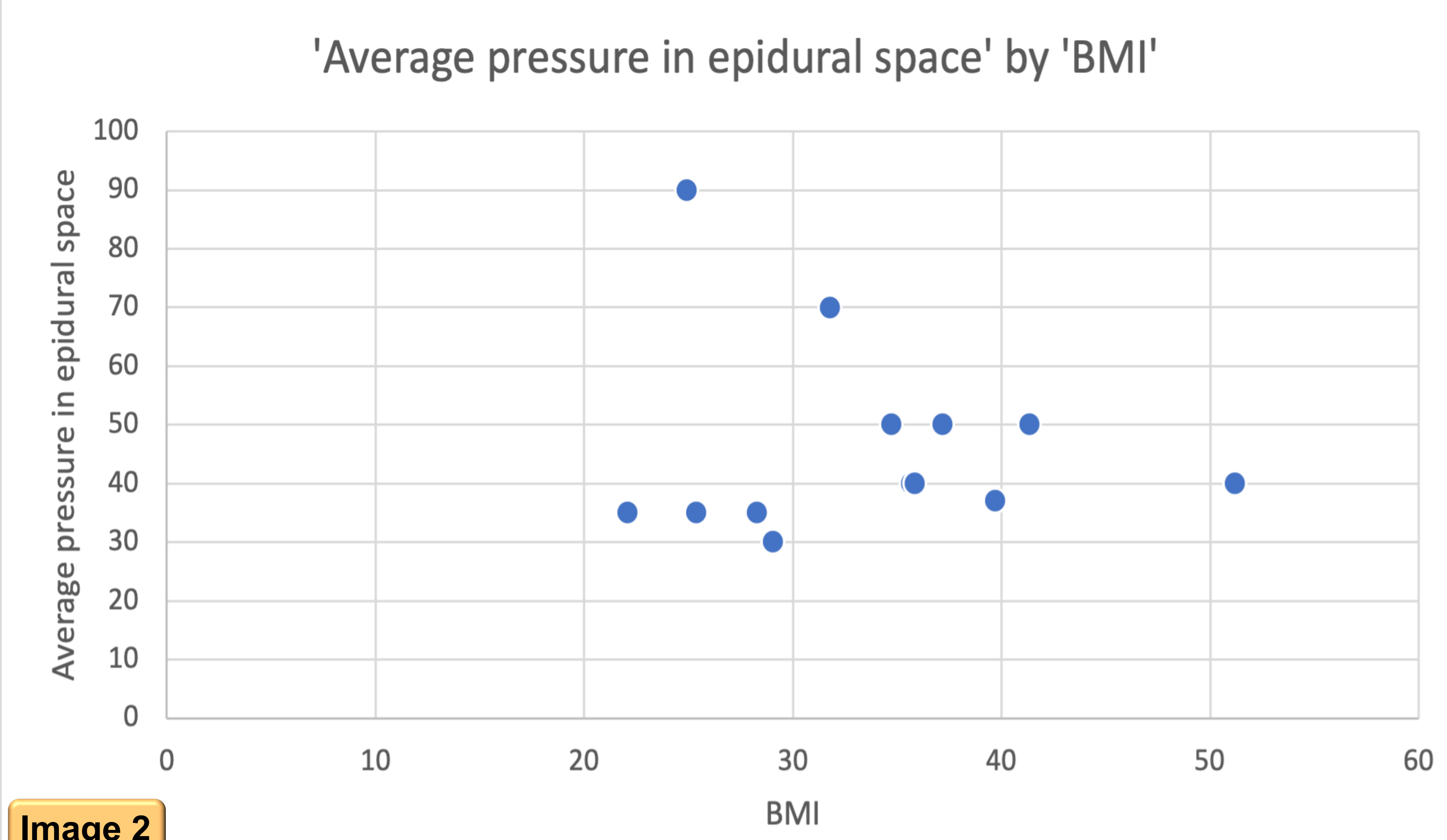


Image 2

We measure the average pressures in the ligamentum flavum and epidural space during a successful epidural placement to analyze a correlation with age and BMI. In a population of 51 patients Compu-Flo was used, the pressures of 13 subjects were measured. The ages of these subjects range from 17 years old to 32 years old. The BMI of these subjects range from 22.09 to 51.21. A failed epidural is defined by having to have the LEA replaced, or the patient experiencing a unilateral block. The epidural success rate using the Compu-Flo device in this group was 92%.

Our data shows that the average ligamentum flavum pressure (LFP) in a successful epidural is 135.4 mmHg, with a standard deviation of 11.98 mmHg. There is no correlation between LFP and age of the patient. There is a negative correlation, although statistically insignificant, between LFP and BMI, with $R^2 = 0.1642$. The range of LFP is between 110 and 150 mmHg.

The average epidural space pressure (ESP) measured in a successful epidural is 46.3 mmHg, with a standard deviation of 16.75 mmHg. There is no correlation between ESP and the age of the patient. There is no correlation between ESP and BMI of the patient. The range of ESP is 30-90 mmHg.

Although utilizing the Compu-Flo during LEA placement appears promising, limitations for its usage include: time needed to train providers, cost of equipment, and user experience.



Image 3



Image 4