

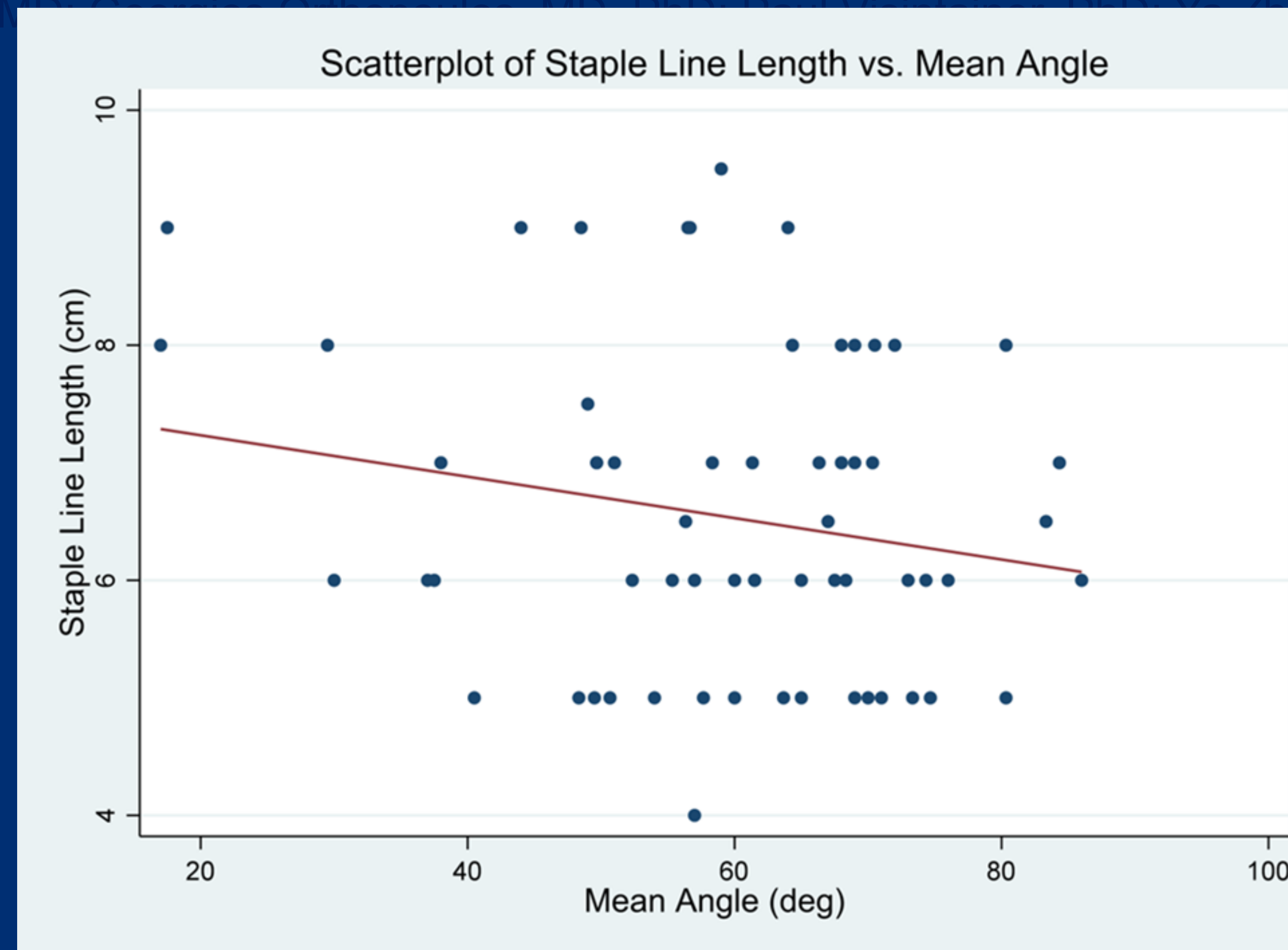
Standardizing the Sleeve Gastrectomy: Understanding the Variability of the Angle of Incisura and Its Role in Creating a Gastric Sleeve

Introduction:

Sleeve gastrectomy has become the most commonly performed bariatric procedure in the world, despite the problem of technical differences that may affect outcomes. Technical standardization may aid in understanding the relationship between anatomy and postoperative outcomes. The stomach has significant anatomic variability, making standardization difficult. Allowing the bougie to follow the angle and guide the starting location of the staple line may lead to a standardized technique, rather than focusing on distance from the pylorus as a fixed value. We hypothesize there is mathematical correlation between the angle and pylorus-to-staple line distance.

Methods:

Photographs were taken of the stomachs before dissection in 64 patients undergoing sleeve gastrectomy over an 18-month period. The pylorus-to-staple line distance was measured and documented at the procedural conclusion. Three surgeons (BSK, GO, JRR) measured the angle of incisura manually. Discordance was defined as an angle measured to be > 10 degrees different than any other measurement; discordant measurements were discarded and means were taken of the other two measurements. Agreement was reached in 34 of 64 photographs. Statistical analysis was performed using the Pearson correlation coefficient to assess the linear relation between mean angle of incisura and staple line distance. To assess agreement among raters in measuring the angle of incisura, the intraclass correlation coefficient (ICC) was estimated.



Results:

There was wide variability of the angle of incisura, as the mean angle as measured ranged from 17 to 86 degrees (mean = 59.4 ± 14.7). Pylorus to staple line distance ranged from 4 to 9.5 cm (mean = 6.5 ± 1.3). There was mild, non-significant correlation between an acute angle of incisura and a longer staple line length ($r = -0.1938$; $p = 0.125$) (Fig. 1). Inter-rater reliability was measured using intraclass correlation coefficient ($ICC = 0.48$; $p < 0.001$), indicating poor-to-fair agreement on angle measurements.

Conclusion:

We observed wide variability in the angle of the incisura, which should be taken into account during the performance of sleeve gastrectomy. There was non-significant correlation between a more acute angle and greater distance between the pylorus and staple line. Measurement of the angle was hampered by poor-resolution photographs and an angled view from the laparoscope. Utilizing preoperative barium swallows, rather than laparoscopic photos would allow more reliable measurement of the angle of incisura, would allow for better reliability in measurement.

Future Directions:

Future studies could include correlating outcome rates based on the measured angle of incisura and distance from the pylorus to the staple line. Potential outcomes to be studied include percentage excess weight loss, effect on HgbA1c, as well as effects on complication rates including staple line leak, stricture, and nutritional deficiency.

References:

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