Nipple Position to Pinpoint Localization of Chest Drain Insertion in Female Trauma Patients: The NIPPLE-Trial—A Landmark Study

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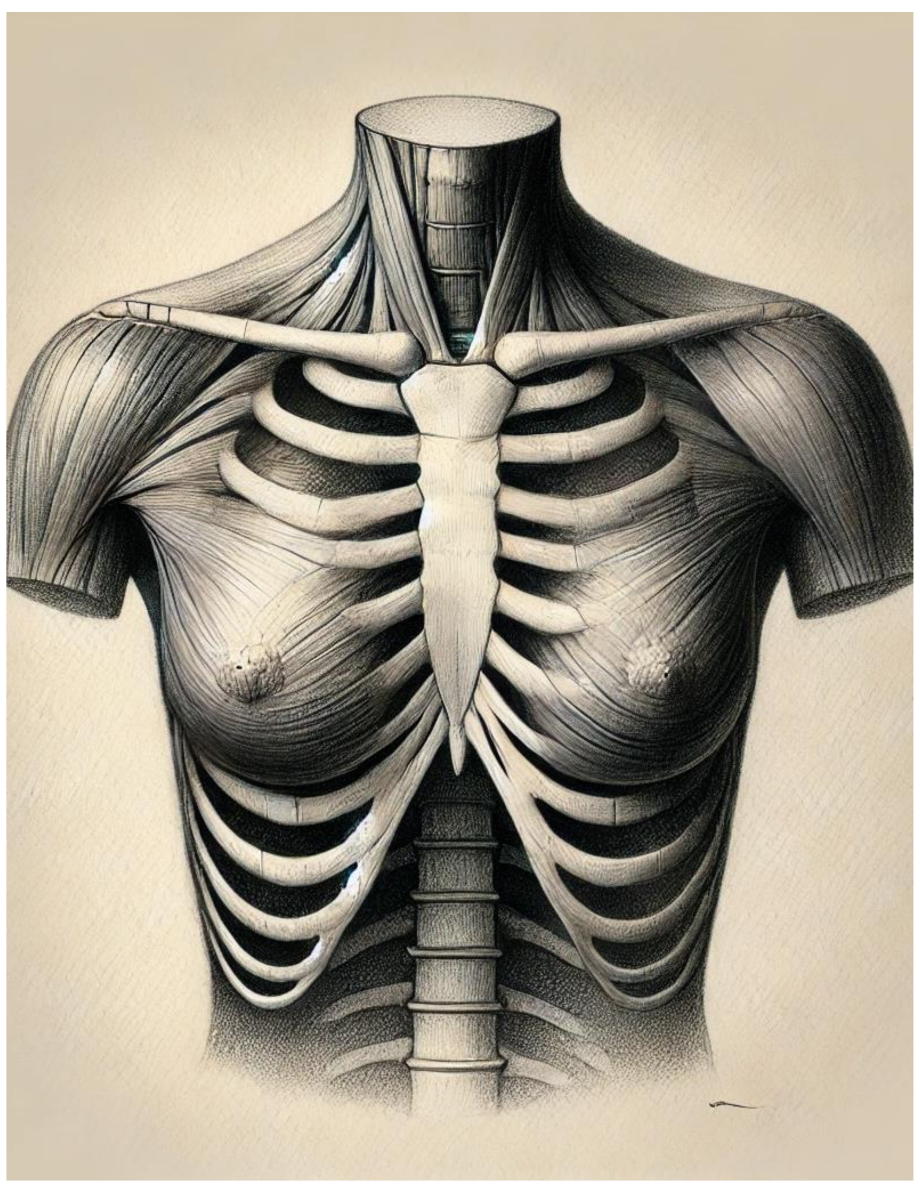
Background and Purpose:

Chest drain insertion is a critical procedure in managing thoracic trauma, commonly guided by anatomical landmarks within the "triangle of safety." The inferior margin of this triangle is traditionally identified by the nipple line, presumed to correspond to the fifth intercostal space (ICS). However, concerns exist regarding the accuracy of this landmark in female patients due to variations in breast anatomy.

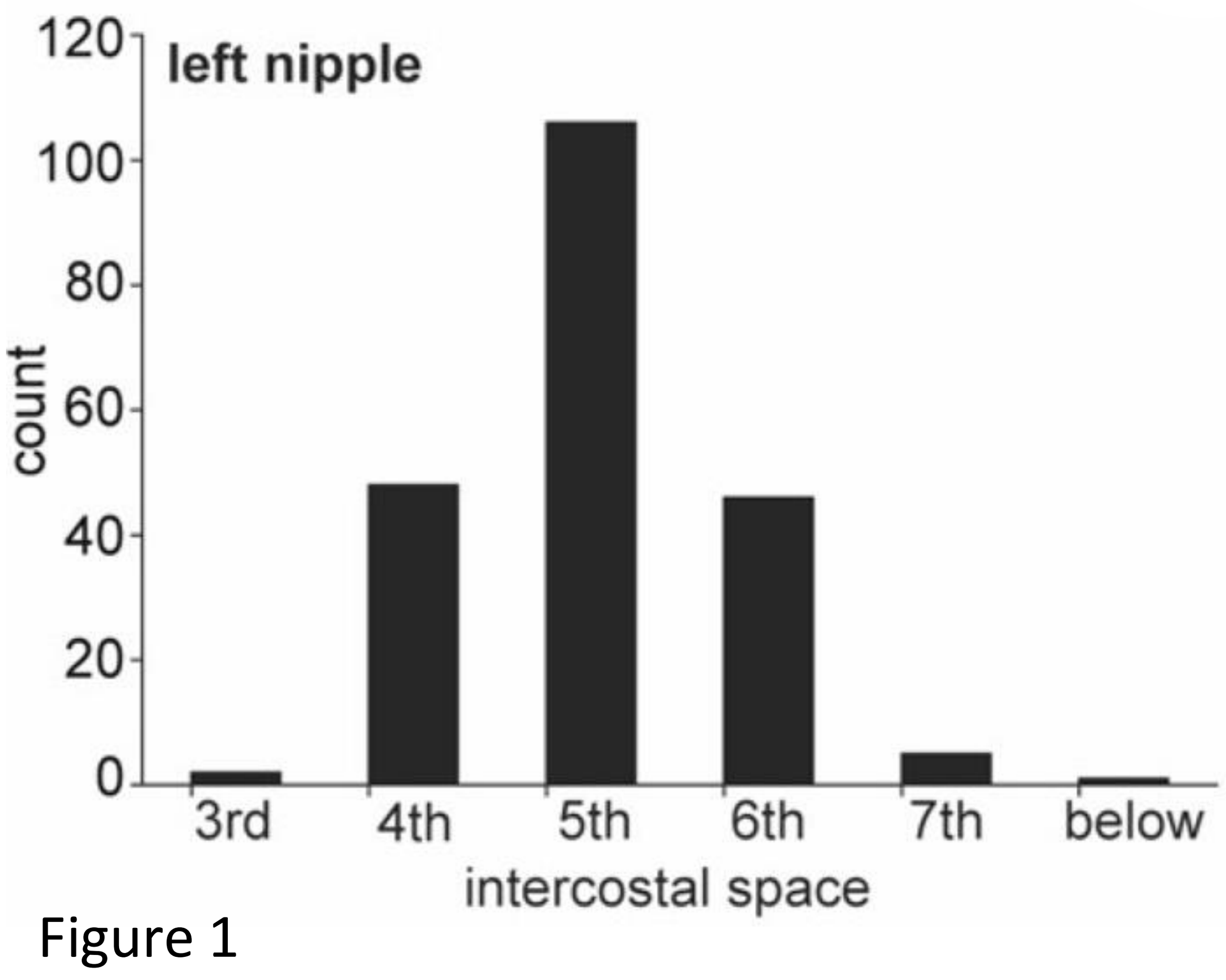
Methods:

An anonymous online questionnaire was distributed among female surgeons. 237 female surgeons participated, after excluding incomplete responses and those with prior breast surgery, 208 participants were analyzed. Epidemiological data (age, number of pregnancies, history of breastfeeding) was collected. Height and weight were reported, and body mass index (BMI) was calculated. Chest circumference and underbust girth were self-measured, and the results were reported. The measurement of the nipple position was performed via self-assessment by the women: While lying in a supine position, the sternoclavicular joint was identified via palpation. From there, individual intercostal spaces were palpated and counted from cranial to caudal until the level of the nipple was located.



Results:

208 participants (416 nipples) were included in the analyses. Mean hight was 169 ± 6 cm, the calculated BMI was 22.9±4.3 kg/m2. In the supine position, both nipples were located in the 5th (±0.8) intercostal space. In 11.8% of the women, left and right nipples were located in different intercostal spaces (Figure 1). Age, BMI, height, weight, and status post-pregnancy had no significant impact on nipple position. A history of breastfeeding correlated with lower nipple position and reached statistical significance for the left nipple ($p = 0.036$ for left nipple, $p = 0.084$ for right nipple), but this statistical finding does not reach clinical significance.



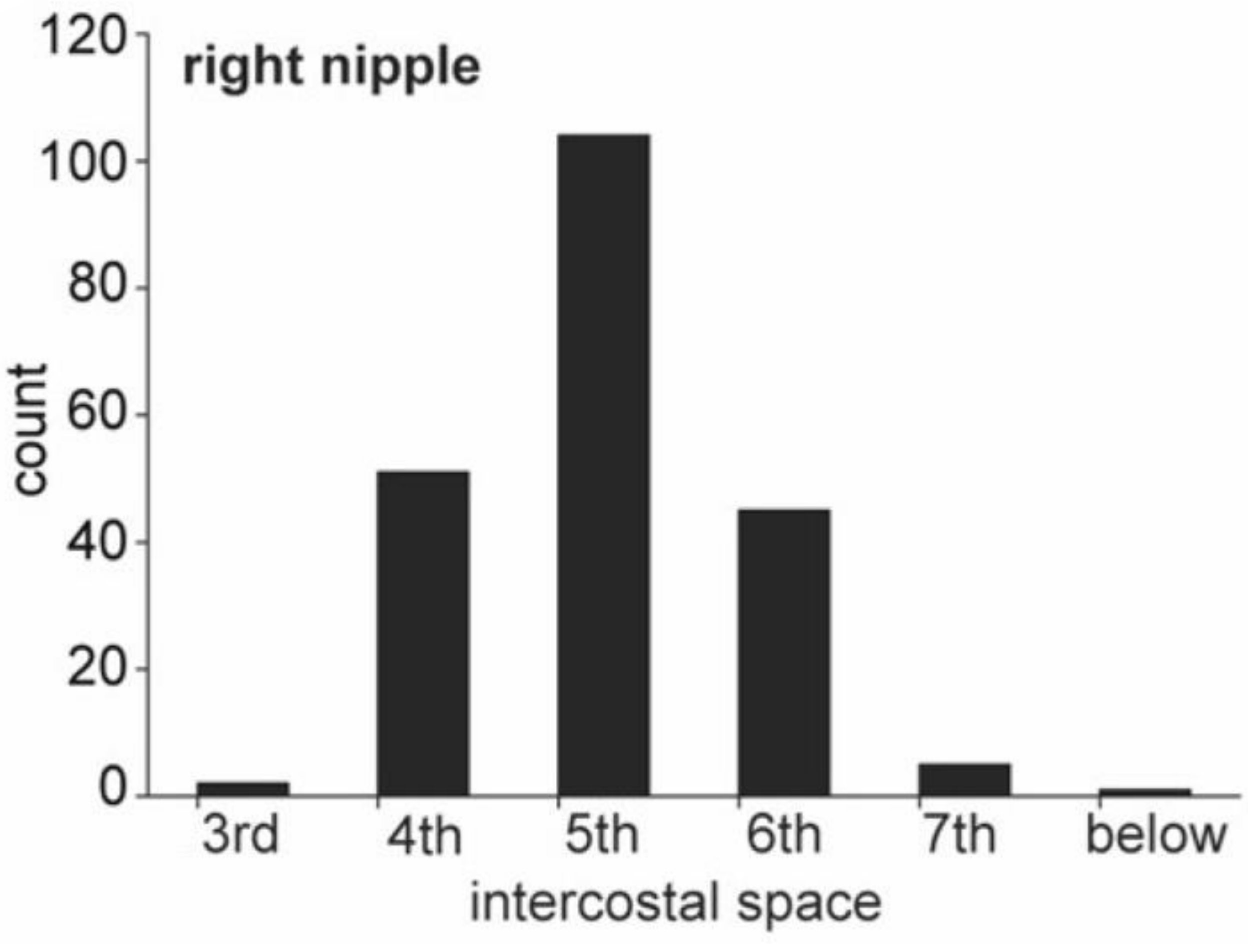


Figure 1

Conclusion:

The main hypothesis can be verified: The nipple is a reliable landmark for the 5th ICS in supine-lying women. Chest drains inserted above the nipple line in the anterior axillary line are located in the 4th or 5th ICS and should therefore be safely above the level of the diaphragm.

Thus, this study does not only close a gender data gap, it creates a new one: to date, there is no solid scientific proof for the claim that nipple position can serve as a reliable landmark for safe chest drain insertion in male patients.

Further studies are needed.

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