Title : THE CELIAC GANGLIA IN MAN: NORMAL ANATOMIC VARIATIONS

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## Introduction

Pain from advanced, unresectable carcinoma of the pancreas or stomach is difficult to manage. Pain relief from narcotics is often not possible or accompanied by undesirable side effects. One method used to control pain associated with these malignancies is blocking the celiac plexus. Success rates in relieving abdominal and back pain with blocks are difficult to evaluate because pain relief is subjective. An extensive study done by de Takats of 1,712 cases abstracted from the literature showed a 75% success rate of splanchnic analgesia.[1] Possible reasons for the high rate of unsuccessful blocks include improper needle placement, anatomic variations of the celiac plexus, lack of diffusion of the drug through the retroperitoneal space, injection of too little drug, and addiction of the patient to narcotics.

## Methods

The celiac ganglia and plexus were examined during autopsy in 20 adult bodies. The cause of death of each individual was known but in no body was the celiac plexus area involved in the disease process. In all bodies, the thorax and abdomen were opened and the greater splanchnic nerves identified as they entered the celiac ganglia. Great care was taken not to disturb the celiac ganglia from the underlying fascia and thus preserve the true anatomic relationship. The number and size of the ganglia and their relationship to the celiac artery were determined by direct measurement, their relationship to the anterior vertebral column, and to different vertebral levels were determined by roentgenography after markers outlining the ganglia had been applied.

## Results

The celiac ganglia were found to vary in number, size, and location. On each side the number of ganglia ranged from 1-5 but averaged 2.70 and 2.75 on the right and left respectively. In size, the ganglia varied between 0.5 and 4.5 cm. in diameter. Ganglia on the left were lower than on the right; the discrepancy between the sides averaged less than one vertebral level although the extremes of variation between the sides were greater than 1 1/2 vertebral levels. On both sides the ganglia were below the celiac artery; average distance was 0.6 cm. on the right and 0.9 cm. on the left. The most consistent relationship of the ganglia was to the anterior vertebral margin; most frequently the ganglia were less than 1.5 cm. anterior to this margin. The use of computed tomography for locating the celiac artery and ganglia before the blocks gave inconsistent results.

## Discussions

The celiac plexus is not a separate and distinct structure, but instead is arbitrarily established as the upper part of the plexus of autonomic nerves around the aorta. The celiac ganglia are enmeshed within the plexus. Because of the indistinct boundaries, considerable variation of the plexus in relation to a given vertebral level is expected. We believe that the ganglia represent the center of the celiac plexus; hence, techniques for blocking the plexus should attempt to position the needle tips near these ganglia. Because the ganglia are at different vertebral levels, techniques using right and left needles should result in more nearly precise placement of the drug. Based on the anatomic variations of the celiac plexus and ganglia, the following recommendations are made. 1) The needle on the left should be placed so the tip is at the level of the junction of the middle and lower thirds of the first lumbar vertebrae, whereas the needle on the right should be placed 1 cm. higher. 2) The needle tip should be placed 1-1.5 cm. anterior to the anterior vertebral margin.

## References

1. De Takats G: Splanchnic anaesthesia: A critical review of the theory and practice of this method. Surg Gynecol Obstet 44: 501-519, 1927.