

## Predicting of Pathologic Response to Neoadjuvant Chemotherapy in Locally-advanced Gastric Cancer by Volumetric Computed Tomography

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### Abstract

This study's aim is to evaluate the accuracy of CT volumetry in terms of predicting response to NAC in locally advanced GC. Pre- and post-chemotherapy volume of the tumor were measured using a dedicated 3D software (GE AW Volumeshare 5) and compared to histopathologic assessment of response. In patients with good response median tumor volume decrease was 54% vs 21% in patients with poor response,  $p < 0,0001$ . CT volumetry with a cut-off 37 % of tumor volume reduction predicts good morphological response after 3 cycles of neoadjuvant chemotherapy in locally advanced gastric cancer with an overall accuracy of 92 %.

**Key words:** Review, Gastric Cancer, Radiologic Diagnosis, Computer Tomography, Volumetry.

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### References

1. Davydov M. I., Turkin I. N., Davydov M. M. Encyclopedia of gastric cancer surgery. Moscow: Ecsmo, 2011. 532 p. (in Russian).
2. Silant'eva N. K., Agababjan T. A., Skoropad V. Ju., Grishina O. G. Problem of computer tomography in examination of patients with gastric cancer in oncoradiological clinic. Siberian Oncological Journal. 2015. No. 5. P. 5–13 (in Russian).
3. Ge L., Wang H., Yin D. et al. Effectiveness of 5-fluorouracil-based neoadjuvant chemotherapy in locally-advanced gastric/gastroesophageal cancer: A meta-analysis. World J. Gastroenterol. 2012. V. 18. No. 48. P. 7384–7393.
4. Kikuchi S., Hiki Y., Shimao H. et al. Tumor volume: a novel prognostic factor in patients who undergo curative resection for gastric cancer. Langenbecks Arch. Surg. 2000. V. 3. No. 385. P. 225–228.
5. Lee T., Purdie T., Stewart E. CT imaging of angiogenesis. Q. J. Nucl. Med. 2003. V. 47. No. 3. P. 171–187.
6. Liu J., Wan Y., Wang Z. et al. Perfusion and diffusion characteristics of endometrial malignancy based on intravoxel incoherent motion MRI at 3 T: comparison with normal endometrium. Acta Radiol. 2016. V. 57. No 9. P. 1140–1148.

7. *Mandard A., Dalibard F., Mandard J. et al.* Pathologic assessment of tumor regression after preoperative chemoradiotherapy of esophageal carcinoma. Clinicopathologic correlations. *Cancer*. 1994. V. 73. No. 11. P. 2680–2686.
  8. *Ng C., Husband J., Mac Vicar A. et al.* Correlation of CT with histopathological findings in patients with gastric and gastroesophageal carcinomas following neoadjuvant chemotherapy. *Clin. Radiol.* 1998. V. 53. No. 3. P. 422–427.
  9. *Wang Z., Wang C., Ding Y. et al.* CT volumetry can potentially predict the local stage for gastric cancer after chemotherapy. *Diagn. Interv. Radiol.* 2017. V. 23. No. 4. P. 257–262.
  10. *Wu A., Ji J.* Neoadjuvant chemotherapy for locally advanced gastric cancer: With or without radiation. *World J. Gastrointest. Surg.* 2012. V. 4. No 2. P. 27–31.
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