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Michael G. Noujaim
University of Massachusetts Medical School

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UTILIZING MUCOSAL PROTRUSION ANGLES TO DISCRIMINATE BETWEEN TRUE AND FALSE MASSES OF THE SMALL BOWEL ON VIDEO CAPSULE ENDOSCOPY

Michael G. Noujaim MSc¹, May Min MD², David Cave MD/PhD^{2,3}

¹University of Massachusetts Medical School, ²Department of Internal Medicine, ³Division of Gastroenterology, University of Massachusetts Medical School

Background: Video capsule endoscopy (VCE) has significantly improved our ability to detect small bowel tumors. However, diagnosing small bowel tumors has remained a challenge due to their low incidence, nonspecific presentations, and the inability to use VCE to biopsy lesions identified during passage through the small bowel. To address this challenge, Girelli et al. developed a novel scoring system called the “smooth, protruding lesions index at capsule endoscopy” (SPICE) to distinguish true submucosal masses from innocent bulges¹. In our study, we compared the utility of an additional morphologic criterion, the mucosal protrusion angle, with SPICE scores in detecting true submucosal masses of the small-bowel.

Methods: We retrospectively reviewed the charts of 300 patients over the age of 18 who had undergone VCE for suspected small bowel lesions between the years of 2002 and 2017. In total, we analyzed the VCEs of 36 patients. SPICE scores were calculated for each patient as outlined in Girelli et al. and mucosal protrusion angles were measured using a protractor placed on the computer screen. We calculated the sensitivity, specificity, positive predictive value (PPV), and negative predictive value (NPV) of both SPICE and protrusion angle. The protrusion angle was defined as the angle between the polyp and surrounding mucosa, and we hypothesized that an angle $> 90^{\circ}$ suggested an external protrusion while an angle $< 90^{\circ}$ suggested a submucosal mass or true polyp.

Results: 25 patients had true submucosal masses (2 GIST, 6 carcinoid, 5 Peutz-Jeghers, 3 inflammatory polyps, 2 hamartomatous polyps, 1 lymphoma, 1 lipomatous polyp, 2 tubular adenomas, 1 leiomyoma, 1 cavernous hemangioma, 1 hyperplastic polyp, 1 lymphatic nodule), and 10 patients had innocent bulges due to extrinsic compression. True submucosal masses when compared to innocent bulges had an average measured angle of protrusion of $45.7^{\circ} \pm 20.8^{\circ}$ vs. $108.6^{\circ} \pm 16.3^{\circ}$ ($p < 0.0001$; unpaired t -test). When compared with SPICE scores, a mucosal protrusion angle $< 90^{\circ}$ had a higher sensitivity (96.0% vs. 35.0%), specificity (90.0% vs. 82.0%), PPV (96.0% vs. 82.0%) and NPV (90.0% vs. 35.0%). Acute angle of protrusion accurately discriminated between true submucosal masses and extrinsic compression bulges on Fisher’s exact test ($p = 0.0001$).

Conclusion: Protrusion angle is a simple and useful tool for differentiating between true submucosal masses and innocent bulges of the small-bowel. Further prospective studies are needed to validate its utility in minimizing invasive interventions.

Contact:

Michael Noujaim

Medical Student

University of Massachusetts Medical School

Michael.Noujaim@umassmed.edu