



How to perform water exchange colonoscopy, with tips and tricks

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Water exchange (WE) colonoscopy is a standardized insertion technique entailing gasless insertion to the cecum, maximizing cleanliness during insertion, and avoiding distension of the colon through removal of excess water and residual air.¹ In essence, through infusion and nearly simultaneous suction of water, with the use of WE all

colon content is substituted by a layer of clear water, facilitating insertion of the instrument into the cecum (Figures 1 to 9).¹ The colon is less elongated, and its bends and flexures are smoother and easier to negotiate. Correct technique entails removal of infused water predominantly during insertion; hence, scarce amounts are left to aspirate during withdrawal.¹ Withdrawal is

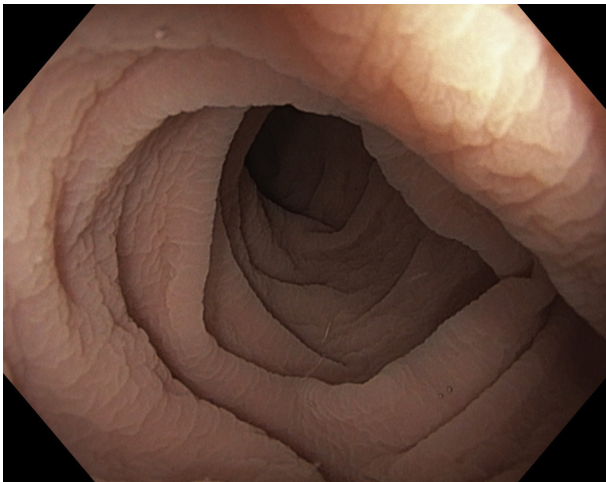


Figure 1. Insertion is carried out in clear water, all gas pockets and residual debris being removed. The lumen is distended just as necessary to allow instrument insertion.

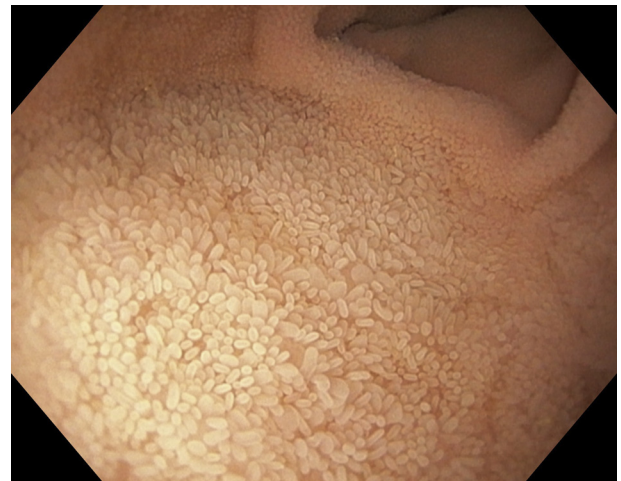


Figure 3. Enhanced underwater view of the villi of the terminal ileum.

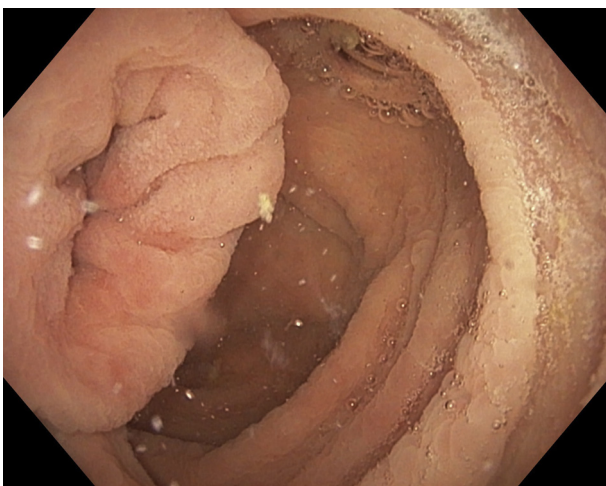


Figure 2. Under water, the ileocecal valve is buoyant; the terminal ileum is easy to intubate.

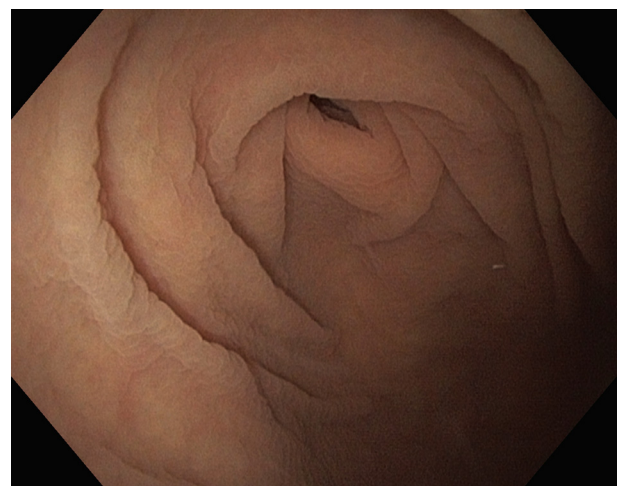


Figure 4. The appendix orifice seen underwater. The cecum is thoroughly cleaned before the withdrawal phase is started.

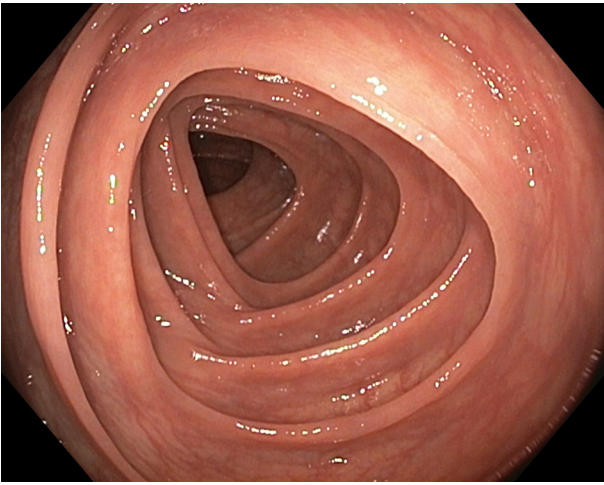


Figure 5. During the withdrawal phase the colon is very clean, and only a few small ponds of water are left to aspirate. This results in less distraction from activities linked to cleaning (irrigation and aspiration) than in procedures with gas insufflation (either air or carbon dioxide) during insertion.

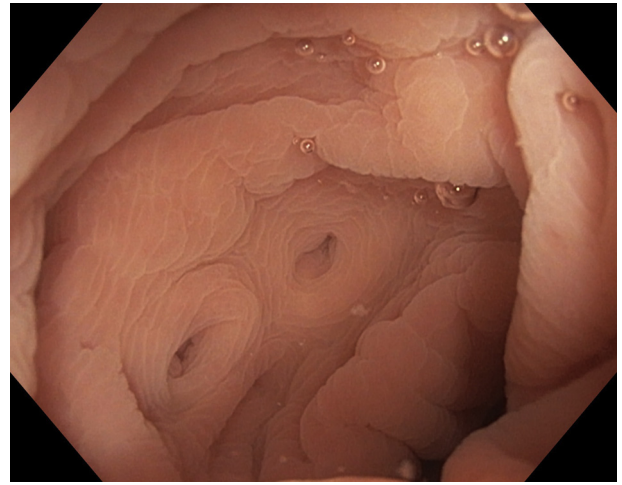


Figure 7. Diverticula seen under water have a different shape; the surrounding mucosa appears to have some circular rings around them. The position of the bowel lumen (at 5 o'clock) is shown by the convergence of longitudinal folds.

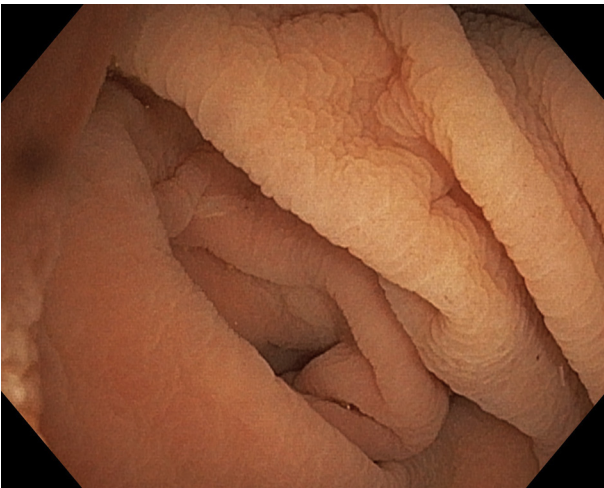


Figure 6. Fake cecum at midtransverse colon. Usually gas bubbles or remnants of the preparation streaming from the proximal segments, and the length of the inserted colonoscope, reveal that the cecum has not been reached.

carried out by the use of gas insufflation to distend the lumen for inspection.

Water exchange must not be confused with water immersion/infusion colonoscopy, a different water-aided colonoscopy technique entailing infusion of water during the insertion phase to open the colonic lumen and progress to the cecum, but without attempts to maximize colon cleanliness.¹ Limited gas insufflation is used as necessary, and residual air pockets are removed when convenient or may be used to bypass colon content.¹ Residual water and feces are suctioned predominantly during withdrawal.¹ The differences between the 2 insertion techniques are shown in greater detail in an earlier teaching video.²

Several high-quality randomized controlled trials and meta-analyses have consistently provided evidence into the benefits of WE³⁻⁵ at both the endoscopist's and

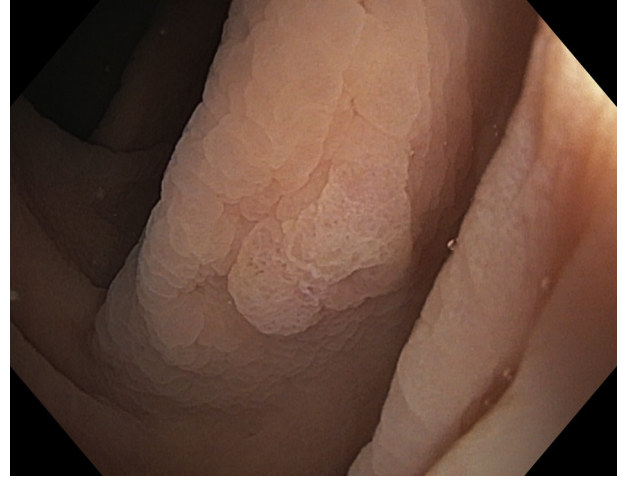


Figure 8. Flat polyps (here in the transverse colon) buoy into the lumen and are more visible.

the patient's levels. Compared with gas insufflation (either air or carbon dioxide) colonoscopy, WE is the least painful insertion technique and reduces pain and requirement for sedation.^{3,4} In detail, WE is effective in decreasing the request for on-demand sedation and for additional medication in patients receiving minimal sedation, achieving high proportions of unsedated or minimally sedated procedures.¹ The routine use of sedation for standard lower endoscopic procedures is cost prohibitive.⁶ If one were to look at this from the patient's perspective, the benefit of the unsedated or on-demand sedation approach is the short time until return to normal activity. At institutions adopting these approaches to sedation, the use of WE could generate considerable institutional and social savings.^{1,7,8}

Additionally, WE increases colon cleanliness throughout the colon, even in patients using split-dose preparations⁴; significantly increases the adenoma detection rate overall

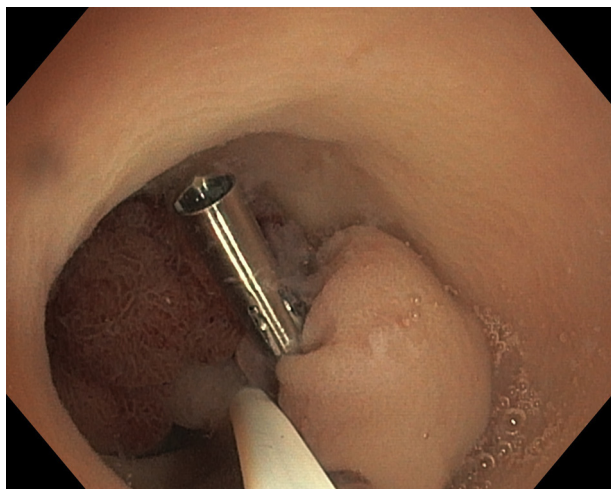


Figure 9. Pedunculated polyp at the sigmoid ensnared and with a clip positioned at midstalk. Even large polyps can be removed under water during insertion.

(for any indication) and in screening^{3,4} and also in the right colon segment⁴; and is associated with significant improvements in specific patient-centered outcomes.⁵

These favorable outcomes are achieved at the expense of a longer cecal intubation time in comparison with gas insufflation, from (mean minutes \pm standard deviation) 1.4 ± 3.4 to 3.9 ± 1.1 additional minutes.⁵ However, with a similar withdrawal time, the mean total procedure time for WE requires only 1.8 ± 6.2 additional minutes, which decreases to a mean of only 1.0 (95% confidence interval, 0.9–1.1) additional minute when the procedure is done by endoscopists with high expertise in WE.⁵

Water exchange requires new sets of skills and training periods, and it is best performed after hand-on training.¹ However, it can be easily learned when the correct technique, tips, and tricks proposed by experts are followed.⁹ For experienced colonoscopists, the learning curve is about 50 cases; cecal intubation times can approach baseline after about 100 cases.⁹

In this video demonstration (Video 1, available online at www.VideoGIE.org) we offer a pragmatic guide on how to perform WE in daily practice, along with some tips and tricks that readers may find helpful.

A few key points to remember:

- Keep the water in front of the instrument as clear as possible during advancement of the colonoscope.
- Keep the suction port of the instrument in the center of the lumen to facilitate suction. The tip of the colonoscope should be at 11 o'clock; this will reduce the incidence of suction-related mucosal capture.
- Orient the colonoscope tip correctly so the jet of water then opens the lumen as necessary to achieve a slitlike appearance, facilitating correct direction of advancement.
- No lumen is seen when the tip of the instrument is too close to the mucosa; pull back the tip to see the big picture. Often water infusion and suction indicate

the lumen direction from which the fecal stream comes. Additionally, directions from which air bubbles come also can indicate the location of the lumen.

- Check volume infused and suctioned periodically; at the cecum the volume infused and aspirated will be similar.
- Remember that the active part of the WE technique is to remove air and residual debris.
- It is not uncommon to get a suction mark close to the appendix.
- Remove water in the cecum before insufflating gas to initiate the withdrawal phase.

DISCLOSURE

All authors disclosed no financial relationships relevant to this publication.

Abbreviation: WE, water exchange.

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