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Looping and Abdominal Pressure

A Visual Guide to a Successful Colonoscopy

ABSTRACT

Looping is a common occurrence during colonoscopy. Once a loop has occurred and the endoscopist has reduced it, abdominal pressure given by the technician will help the loop from re-forming. In this article, we discuss some of the common loops that are formed, the methods the endoscopist must employ to reduce the loop, and the type of abdominal pressure used by the technician to help prevent the loop from re-forming and, thus, help attain cecal intubation. Hand placement for abdominal pressure is discussed and illustrated to provide a visual guide for the technician.

It has been said that performing a colonoscopy is equivalent to attempting to push a garden hose around your house. Resistance is encountered while negotiating corners, and loops may form that prevent forward movement of the endoscope (Prechel, Young, Hucke, Young-Fadok, & Fleischer, 2005). The focus of this article is to describe some of the typical loops that are encountered during colonoscopy and to offer insight to the assistant who, by providing abdominal pressure, can help prevent loops from forming or reforming as the endoscopist advances the colonoscope. Teamwork is essential in providing an effective and complete examination of the colon from anus to cecum. A thorough knowledge of the patient's medical history as well as size, gender, and age all play a significant role in helping each member of the team prepare for possible barriers to reaching the cecum. Each patient and each colon is unique.

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Background

It is generally known that during routine colonoscopies, loops will invariably form. Several factors can play into this development: previous pregnancies or abdominal surgeries such as a previous hysterectomy, cholecystectomy, abdominal aortic aneurysm, hernia repair, or appendectomy may all contribute to the development of intra-abdominal adhesions which are common following abdominal surgery.

Adhesions are a natural part of the healing process and extend one tissue across to another when the body deposits fibrin into injured tissues. Fibrin acts like glue to seal an injury and this may cause internal organs to attach to the surgical site or to other organs in the abdominal cavity. This can result in fixation of angulations in the colon, which are difficult to navigate around and equally difficult to straighten out once the scope is past. In addition, when a loop is formed in the abdomen during colonoscopy, pulling and/or stretching of the adhesion may cause the patient to become uncomfortable during the procedure.

It is often thought that patient size, specifically gross obesity, may play a factor in whether a loop is formed during colonoscopy. It is the author's personal experience (J.A.P.) that gross obesity in itself is not a major

contributing factor in looping during colonoscopy but may make the application of effective external pressure more difficult.

Description

Longer colons tend to allow loop formation, most commonly in the sigmoid and transverse colon (Roberts-Thomson & Teo, 2009). When looping occurs, at some point the endoscopist will have to pull back or reduce the loops that have formed in the colon. When a loop forms, it will be evident on the auxiliary video monitor that the scope is not moving forward. Attempting to advance the scope at this point will only serve to enlarge the loop and make the patient uncomfortable. The endoscopist will have to pull back to reduce the loop and then advance and repeat as needed to achieve cecal intubation. External pressure is effective in helping prevent the re-formation of these loops.

There are several basic factors to remember when giving abdominal pressure. Always inform the patient of what you are going to do even if under conscious sedation. The patient may appear to be asleep but may surprise you after the procedure by telling you what they heard in the procedure room. Also, the amount of pressure the assistant should use is a common concern. If an auxiliary video monitor is available in the procedure room, the assistant should watch to see if the scope is moving forward. If so, the pressure being exerted is sufficient.

All pressure being given should be delivered slowly but deliberately and, most importantly, gently. Use of the open hand with fingers spread is recommended to be certain that the pressure is distributed evenly from your hand to the patient. This technique allows the patient to be more comfortable than if you were to use your fingertips, which results in pinpoint pressure. In addition, using the open hand with fingers spread covers a broader area. It is important to note that if you feel a pulse, you must ease the pressure immediately so as not to obstruct blood flow. When the endoscopist asks for a release of pressure, the assistant should leave his or her hands or forearms slightly touching the patient so loop formation can be felt. If it is suspected a loop is re-forming, communicate that information to the endoscopist.

When asked to give pressure, it is important to know where the scope is in the colon. This can be done only by watching the auxiliary monitor or asking the endoscopist where he or she believes the scope is in the colon. If the assistant gives pressure in the wrong location, it may prevent the scope from moving forward by collapsing the colon if the pressure is provided ahead of the lumen.

It is recommended that once the procedure starts, the assistant remains in the room till the procedure is complete. Colonoscopy is a team procedure and each team member should carefully watch the monitor to assist in looking for abnormalities.

Looping

It is of utmost importance during the procedure that the assistant communicate clearly with the endoscopist what is being felt (ie, loop formation or scope movement) at any time during the procedure. An experienced endoscopist can generally tell when a loop is being created by the change in resistance felt to scope advancement and the loss of scope-tip movement equal to the scope-shaft advancement (called 1-to-1 movement). When a loop occurs, the slow withdrawal of the scope shaft accompanied by torque of the scope shaft (usually in a clockwise manner) is carried out until 1-to-1 motion is restored.

Even with experienced endoscopists, it can sometimes be difficult to tell where in the colon looping has occurred or why it fails to respond to reduction or abdominal pressure techniques. Some devices exist that can help identify loop formation. In the past, procedures were sometimes done under fluoroscopic guidance, which allowed the endoscopist to visualize the scope in the colon during a colonoscopy. However, this method exposes the patient to unnecessary radiation. According to Dr. Peter Cotton, a newer device involves a magnetic imaging endoscope that is an excellent tool to show how loops develop in the colon. This scope is equipped with small coils within the instrument that can be detected by a pulsed magnetic field created by a bedside device. A three-dimensional representation of the scope's configuration is computed and displayed on a real-time monitor graphic display (Cotton & Williams, 2008).

Abdominal Pressure

The following figures will explain the techniques of abdominal pressure as used to help prevent re-formation of looping. All pressure described in Figures 1–7 is with the patient lying in the supine position and the assistant positioned opposite the endoscopist. As Figure 1 illustrates, a sigmoid loop can develop into the midline area that may look like an "N." The more the endoscopist pushes, the "N" loop will become more pronounced and the scope will not advance (Figure 1a). Reducing the loop will straighten the sigmoid colon, and abdominal pressure can be provided with the right hand placed over the sigmoid from the midline (hand cupped), slightly pushing in and down toward the pelvic bone. This should help prevent the loop from re-forming. A sigmoid loop can also develop and go far to the right lower quadrant under the pelvic bone (Figure 1b).

When the loop is reduced, with the left hand slightly cupped parallel to the pelvic bone, the assistant should press down and up (as in a scooping fashion) toward

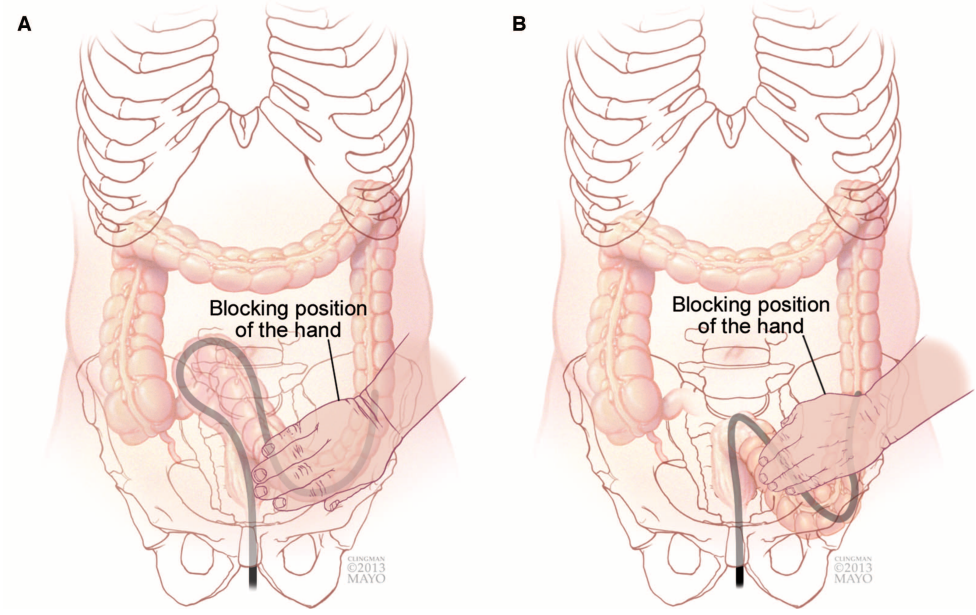

FIGURE 1. (A) Right hand blocking the "N" loop. (B) Left hand blocking the sigmoid loop dipping into the pelvic region. Used with permission of Mayo Foundation for Medical Education and Research. Copyright Mayo Clinic, Rochester, Minnesota. All rights reserved. All permission requests for this image should be made to the copyright holder.

the midline. This should prevent the loop from re-forming into the pelvic region.

Another common area for loops to form is at the splenic flexure up into the splenic region (Figure 2). The spleen is located under the ninth and 11th ribs on the left side and is protected by the ribs. The spleen cannot be felt unless it is abnormally large (Wojciech Pawlina, MD, personal communication, 2013). With the scope looping into the area near the spleen, it is important that the endoscopist be especially careful to reduce the loop so as not to cause injury to the spleen. Once the loop has been reduced, the assistant's right hand should be cupped and parallel to, but not pushing on, the ribs. The assistant should apply gentle pressure down and in toward the midline across the transverse colon; the hand should act as a block to prevent the scope from looping back into the splenic flexure area.

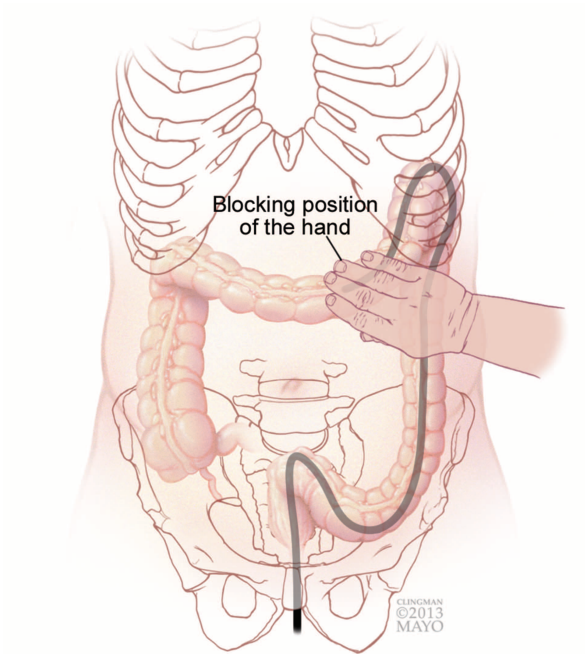

FIGURE 2. Right hand blocking and protecting the spleen. Used with permission of Mayo Foundation for Medical Education and Research. Copyright Mayo Clinic, Rochester, Minnesota. All rights reserved. All permission requests for this image should be made to the copyright holder.

As shown in Figure 3, two loops can form during the procedure. The first loop may form in the sigmoid dipping into the pelvic area and the other loop may form up into the splenic flexure area. Once both loops have been reduced, hand placement should be placed as described in Figure 1b and Figure 2.

Another common area for a loop to form is the transverse colon (Figure 4a). After the loop has been reduced, the right hand is placed on the midline below the sternum with the hand cupped slightly. Gentle pressure should be applied down toward the navel and across to the hepatic flexure. This will prevent the loop from again going up into the diaphragm and will allow for scope advancement.

In Figure 4b, the scope is looping in the transverse colon toward the pelvic region. Once the loop has been reduced, abdominal pressure can be given by placing the hand flat on the abdomen just below the sternum pressing straight down and across toward the hepatic flexure.

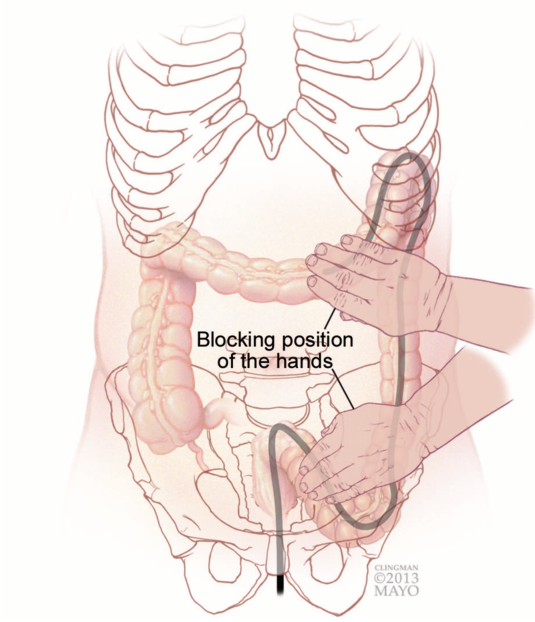

FIGURE 3. Left hand blocking the sigmoid loop, with right hand blocking and protecting the spleen. Used with permission of Mayo Foundation for Medical Education and Research. Copyright Mayo Clinic, Rochester, Minnesota. All rights reserved. All permission requests for this image should be made to the copyright holder.

A hepatic flexure loop may form up and under the rib cage (Figure 5). With the loop reduced, the assistant's right hand should be placed in the cupped position just under the ribs gently pressing down and toward the cecum.

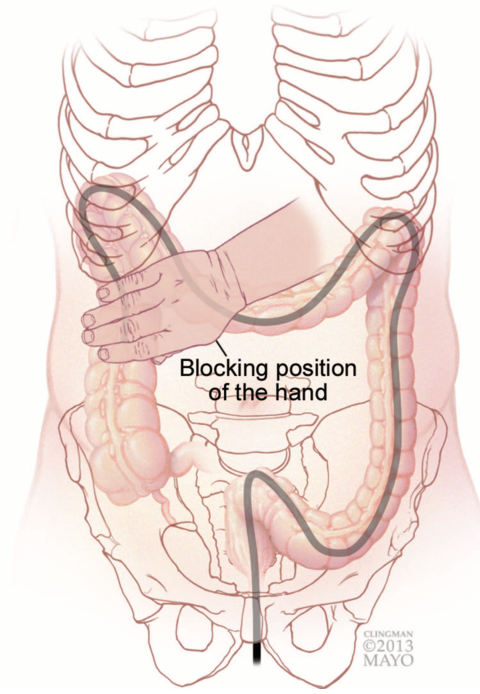

FIGURE 5. Right hand blocking and protecting the hepatic flexure. Used with permission of Mayo Foundation for Medical Education and Research. Copyright Mayo Clinic, Rochester, Minnesota. All rights reserved. All permission requests for this image should be made to the copyright holder.

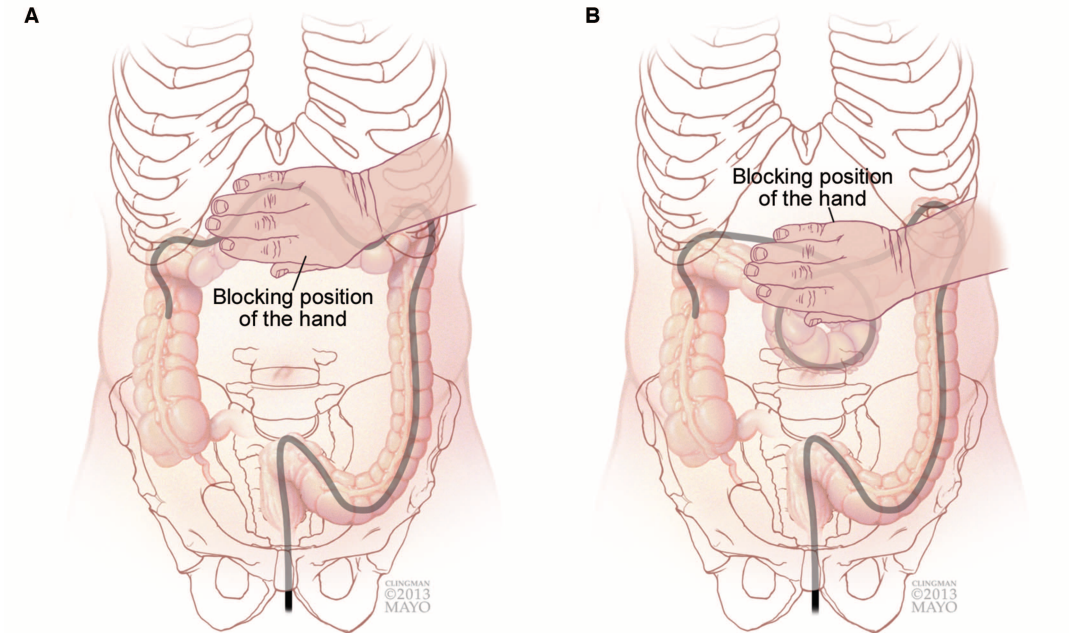

FIGURE 4. (A) Right hand blocking the scope from going into the diaphragm. (B) Right hand blocking the loop from entering the pelvic region. Used with permission of Mayo Foundation for Medical Education and Research. Copyright Mayo Clinic, Rochester, Minnesota. All rights reserved. All permission requests for this image should be made to the copyright holder.

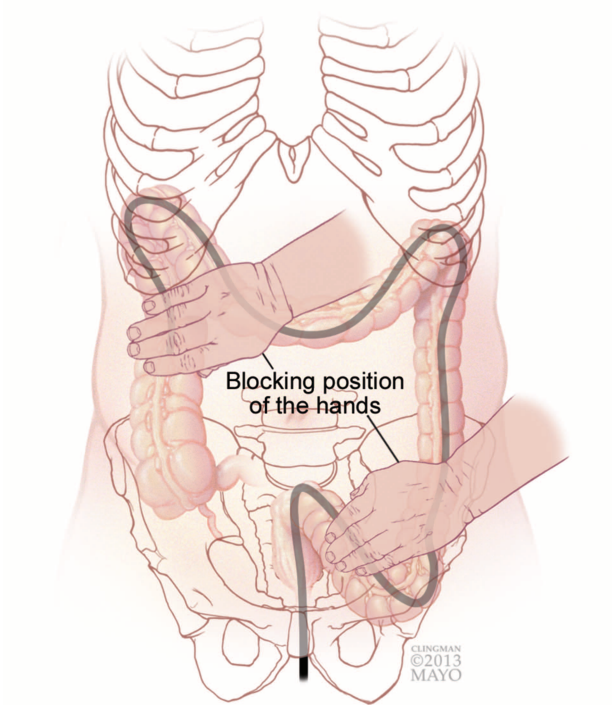

FIGURE 6. Left hand blocking the sigmoid loop, with right hand blocking and protecting the hepatic flexure. Used with permission of Mayo Foundation for Medical Education and Research. Copyright Mayo Clinic, Rochester, Minnesota. All rights reserved. All permission requests for this image should be made to the copyright holder.

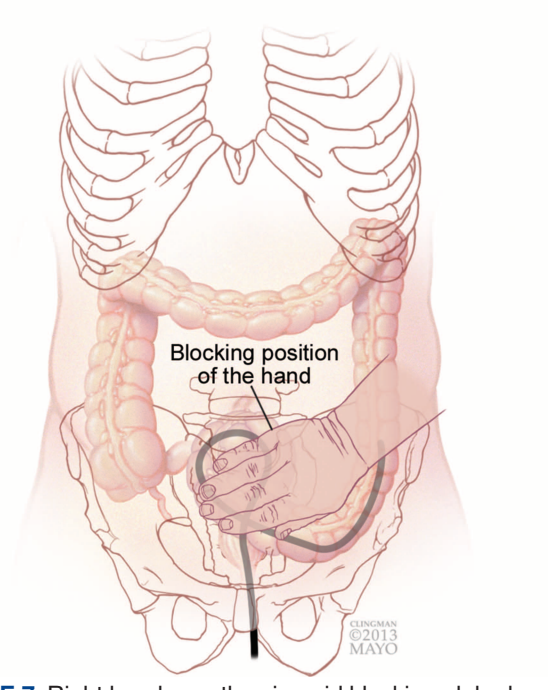

FIGURE 7. Right hand over the sigmoid blocking alpha loop from reforming. Used with permission of Mayo Foundation for Medical Education and Research. Copyright Mayo Clinic, Rochester, Minnesota. All rights reserved. All permission requests for this image should be made to the copyright holder.

The formation of two loops is illustrated in Figure 6. One loop is in the sigmoid pelvic region and the other loop is at the hepatic flexure. When the loops have been reduced, pressure should be given with the left hand slightly cupped and placed parallel to the pelvic bone. Gently press down and up toward the midline. This should prevent the loop from re-forming into the pelvic region. Then, with the right hand in the cupped position placed just under the ribs in the right upper quadrant of the abdomen, gently press down and toward the cecum.

One of the most common loops the endoscopist encounters is the alpha loop, illustrated in Figure 7. This results simply because the scope exaggerates the normal spiral turn of sigmoid colon as the bowel travels posterior and to the left above the rectosigmoid junction. Once the scope tip is in the descending colon or hooked around the splenic flexure, the endoscopist uses clockwise torque of the scope as the scope is slowly pulled back. This maneuver straightens and shortens this rotation in the sigmoid (Sedlack, 2011). Once reduced, the assistant would then provide pressure with the right hand keeping the palm flat and applying gentle downward pressure over the sigmoid region. This technique will splint the colon to help prevent the loop from re-forming.

Another challenge for applying abdominal pressure is with the patient lying on his left side. By performing what has been coined "Prechel Pressure" (Prechel et al., 2005), the use of the forearms for splinting will help give safe and effective abdominal pressure (Figure 8). Prechel Pressure is most effective on loops as shown in Figures 1a, 1b, 2, 3, 4a, 4b, and 7 and is applied with the assistant on the opposite side of the endoscopist using one or both forearms. The left arm is straight from the shoulder to the hand with the little finger on the left hand parallel to the pelvic bone and placed where the pelvic bone and mattress meet (this can be done with fingers extended, knuckles down, or the fisted position). The right arm is also straight from shoulder to hand. The right hand is placed next to the left hand or the hands can overlap. The little finger on the right hand should be placed parallel to the ribs but not pushing on the ribs. With counter pressure given by another assistant from behind the patient (pushing on the patient's right shoulder and the right pelvic bone with extra care *not* to push on any part of the patient's spinal column), push the patient onto the first assistant's forearms, thus using the patient's own weight to provide the splinting (Prechel et al., 2005).

FIGURE 8. Forearm technique covering midline, sigmoid, splenic flexure, and mid transverse. Used with permission of Mayo Foundation for Medical Education and Research. Copyright Mayo Clinic, Rochester, Minnesota. All rights reserved. All permission requests for this image should be made to the copyright holder.

Conclusion

The loops described are the most common that have been encountered during colonoscopy. It would not be possible to describe every scope maneuver that occurs during procedures. However, understanding where loops develop and how to provide abdominal pressure to prevent them from re-forming after the endoscopist has reduced the loop will help to achieve cecal intubation.

Several important points to remember are: (1) good pressure will help shorten the procedure, (2) communication among all members of the team is essential, and (3) knowing the patient's medical history will prepare the entire team for the procedure. In addition, it is important for the assistant to use good common sense.

There is no definitive means to determine how much pressure to use. The assistant must watch the auxiliary monitor and know that if the scope is moving forward, additional pressure is not necessary. If the assistant feels a pulse at any point, he or she must immediately reduce the abdominal pressure. Remember, with the patient on his left side, the use of Prechel Pressure will afford the assistant the opportunity to use the patient's own weight to the assistant's advantage.

Hand placement locations are only suggestions and can be used in any combination that works for the endoscopist, patient, and assistant at that particular time. The next patient will be different from the previous patient, so adaptation to individual requirements is always important. ✪

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