Gastrointestinal Endoscopy News You Can Use - Don’t be Shocked!

2.3 Contact Hours

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Audience
Gastrointestinal/Endoscopic RNs, Perioperative RNs

Objectives

1. List the basic concepts of electrosurgery.

2. Differentiate monopolar, bipolar and argon enhanced electrosurgery.

3. Describe the use of electrosurgery in the endoscopy suite.

4. Discuss safe electrode placement in gastrointestinal surgery.

5. Identify safety precautions used in gastrointestinal electrosurgery.

Purpose
To provide guidelines for the safe and effective use of electrosurgery in gastrointestinal endoscopy procedures.
INTRODUCTION

Electrosurgery is commonly used during gastrointestinal endoscopy procedures to safely deliver electrical current through tissue that produces heat at the cellular level, to cut or coagulate tissue. Electrosurgical units (ESU) generate electrical current that travel from a small active electrode or cautery tip, through the patient, and will exit by way of a large dispersive, return electrode or dispersive pad. The use of electrosurgery can subject both patients and endoscopy staff to the risk of electrocution, therefore a basic understanding of electrical hazards and prevention of injury is crucial. This education module will describe the fundamental concepts and principles of electrosurgery, with basic definitions and explanations. Monopolar electrosurgery, bipolar electrosurgery, heater probe, and argon plasma coagulator methods will be discussed as they apply to utilization and application in the gastrointestinal endoscopy setting.

BASIC CONCEPTS AND PRINCIPLES OF ELECTROSURGERY

- **Electricity** is a phenomenon developing from the existence of positively and negatively charged particles within matter. (1).
  - All matter is composed of atoms (1).
  - Three basic principles of electricity:
    - Electricity always follows the path of least resistance (1) (2).
    - Electricity always seeks to return to an electron reservoir, such as the ground (1) (2).
    - Electricity must have a complete circuit to do work (2).

- **Atoms** contain electrons, protons and neutrons (1).

- **Electrons** orbit the nuclei of atoms.
Once electrons are charged, they jump from one atom to the orbit of another atom, creating a charged particle or ion, and electrical current is generated. (3)

- **Current** is described as the movement or flow of electrons from one atom to another atom, during a period of time and is measured in amperes or amps. (3)

- **Electrons** are set in motion, forming a current that always seeks to travel the path of least resistance. (4)
  - In order for electrons or current to flow, a continuous circuit is needed. (2)

- **Circuit** is the pathway for the uninterrupted flow of electrons.
  - All electrical current must complete a circle. (5)
  - Electrical current flows when electrons from one atom move to an adjacent atom through a circuit. (2)

- **Voltage** drives this electron movement, as it is the necessary force to push the current through the resistance and provide electrons with the ability to travel from atom to atom. (2) (4)
  - The force that causes the movement of electrons is termed voltage and is measured in volts. (1)

- **Resistance** or impedance is an obstacle or resistant to the flow of current, and is measured in ohms. (1) (2) (4)
  - The actual patient tissue provides the obstacle to the flow of current. (1) (2) (4)
  - The resistance of tissue determines the current flow. (1) (2) (4)
  - Electrical current is directly proportional to voltage and resistance in the circuit, as defined by the equation: Current = Voltage/Resistance. (1) (2) (4)
  - The higher the resistance, the greater the voltage needed for the current to pass. (4)

- **Heat** is produced when electrons encounter resistance. (2)
  - As electrons encounter impedance, heat is produced, and a tissue effect results. (3)

The electrosurgical generator provides the electromotive force as it is the source of electron flow and voltage, and drives the current. (4) The circuit is composed of the electrosurgical generator, active electrode, the patient and the patient return electrode. The patients’ tissue provides the impedance or resistance, producing heat as the electrons overcome the impedance.

As tissue temperatures exceed 45 degrees Celsius, the proteins in the tissue become denatured, losing their structural integrity. (4) As tissue temperatures exceed 90 degrees Celsius, the liquid in the tissue evaporates. (4) Once the tissue temperature reaches 200 degrees Celsius, the remaining solid components of the tissue are reduced to carbon. (4)
CUT, COAGULATION, BLEND, FULGURATION AND DESICCATION

Electrosurgical generators produce a variety of electrical waveforms. As waveforms change, the effect on the tissue changes as waveforms change from pure cut to pure coagulation (3). The variations in the waveform determine the changes in the tissue. Electrosurgical generators provide energy delivery in two types of modes: continuous and interrupted (4). The continuous mode of current output is most often referred to as the “cut” mode. The interrupted mode of current delivery is referred to as the “coagulation” mode (4). The blend mode modifies the degree of current interruption (4). The most commonly used waveform modes are cutting, coagulation and blend (1).

**CUT**

In the cutting mode, the electrical flow is continually applied, and heat is quickly generated for cutting and tissue vaporization (3). Current is high, but voltage is low (2) (3). As less force is used to push the current, the cut mode may be considered safer than other modes (3). The cut mode produces a constant bombardment of electrons on the tissue, heat is produced, cells rupture and the tissue is cut (3). The high current and low voltage produces an intense heating effect that vaporizes the tissue with the least effect on coagulation (2). The active electrode should be held slightly above the tissue so that the electrons or spark have to jump though the impedance of the air to reach the target site and generate more heat (2) (3).

**COAGULATION**

Coagulation uses an intermittent waveform. The interrupted waveform produces less heat. Instead of tissue vaporization as in cut, a coagulum is produced. The waveforms have higher voltage and lower current than a cut waveform (2). Tissue is heated, and then cooled, producing a coagulation effect (2) (3).

**BLEND**

Blend is accomplished by a waveform that is a combination of both the cutting and the coagulation waveforms which produces a tissue reaction that combines both cutting and coagulation effects (1). This mode is used when hemostasis is needed while cutting.

**FULGURATION**

Higher voltage allows the active electrode to be held over the area while a fulguration or spraying or fulguration effect delivers the electrical energy to coagulate a larger area (3). The tissue effect is superficial, collapsing the cells and producing a coagulum instead of vaporization (3). This mode is used when a surgical field is oozing and a bleeder cannot be identified (2). Fulguration is non-contact coagulation (do not touch with active electrode) to create the spark which results in heating and necrosis, as well as greater thermal spread over a wide area (2). Less heat is generated and the sparks create a coagulum rather than vaporize the tissue (4).

**DESICCATION**

Desiccation is another form of coagulation (2). Desiccation or dehydration occurs when the active electrode is in direct contact or touching the tissue (1) (4). All of the electrical energy is converted into heat within the tissue, so less heat is generated (2). The end result is deeper necrosis and greater thermal spread (2). This action will result in the tissue drying out and a coagulum being formed (4).
MONOPOLAR ELECTROSURGERY

Monopolar is the most commonly used electrosurgical mode. In this mode, the patient becomes part of the electrical circuit. In monopolar electrosurgery, electrical energy flows from the electrosurgical generator through an active electrode to the patient and then, follows the path to a dispersive electrode or pad placed on the patient’s body that is connected to the generator (3). The current completes a circuit. If energy is concentrated in a small area, and the tissue provides increased impedance, controlled heat is generated and cutting or coagulation is achieved (3).

BIPOLAR ELECTROSURGERY

Bipolar electrosurgery uses electrical current where the circuit is completed by using two parallel poles located close together (1). One pole is positive, the other is negative, and the flow of current is restricted between the two poles (1). Both active and return electrodes are located at the site of surgery, within the instrument tip (2). Current does not flow through the patient, and a dispersive electrode or grounding pad is not required (2) (3). Bipolar units use a lower voltage waveform that achieves hemostasis without unnecessary charring and diminishes minimal collateral tissue involvement (1). The flow of electricity may stop if a certain impedance level is reached as the tissue grasped is the tissue included in the electrical circuit (3).

ARGON PLASMA COAGULATION (APC)

Argon–enhanced electrosurgery is a non-contact monopolar application and uses a dispersive pad. Argon plasma coagulation (APC) utilizes argon gas to promote the flow of electricity, at a much lower voltage (7). The argon gas carries the current from the active electrode to the tissue, without the instrument coming in contact with the tissue (7). The indications for APC are homeostasis and tissue ablation (7). It is ideal for broad diffuse lesions due to the non contact application (7). APC works well in areas that are otherwise difficult to reach, and produces an even, rapidly healing eschar (7). There is a risk of gas emboli when the active electrode is placed in direct contact with tissue or directed into an open vessel (6) (8). All safety concerns that apply to electrosurgery in general also apply to the APC (7).

DISPERSONE ELECTRODE OR PAD

The dispersive electrode or pad is used during monopolar electrosurgery. The return or dispersive electrode returns the current from the patient’s tissue to the electrosurgical unit (1). Placement of a dispersive electrode pad is crucial to prevent patient injuries, and should be placed after final positioning of the patient (3) (6). The dispersive electrode surface area is large enough to disperse the current used, therefore minimizing the concentrated energy so as not to generate significant heat on the skin (3). A single use dispersive pad should be placed on a well vascularized muscle mass, avoiding bony prominences, scar tissue, significant hair, size appropriate for patient, and not altered (e.g., cut or folded) (3) (6). The electrode should not be placed over an implanted metal prostheses, or tattoos which may contain metallic dyes (6). The pad should be placed as close as possible to the surgical site (6).
## COMPLICATIONS

Electrosurgical units use a monitoring system to measure the quality of the contact between the patient’s skin and the dispersive electrode (1). If the pad becomes dislodged or high resistance exists between the pad and the patient’s skin, the unit will sound an alarm and become disabled (1). High resistance may be caused by excessive hair at the placement site, air trapped between the pad and the skin, or placement over poorly conductive tissue (1). Stray current can flow through alternate ground sites (2), therefore contact between the patient and metal devices should be avoided (6). Metal devices include the OR bed, IV stands, stirrups, and electrocardiogram electrodes. If the intended path is compromised, the circuit may be completed through other routes, and may cause alternate site burns. Burns to the patient and endoscopy personnel can also occur when the active electrode tip is not protected or secured.

Another complication to avoid is implanted cardiac devices, pacemakers and cardioverter defibrillators, as they are vulnerable to interference from the electrical signals from the electrosurgical unit (7). Cardiac device manufacturers’ instructions should be followed when using electrosurgery.

Fire is a major hazard and concern when utilizing electrosurgery in the gastrointestinal endoscopy suite due to the enriched oxygen atmosphere and the number of existing fuels. Fuel can include drapes, sponges, alcohol-based solutions, and methane gases. A fluid filled container and a large syringe filled with water or saline should always be available during the procedure. Endoscopy suite personnel must be trained in the safe use of electrosurgery units as well as fire prevention and emergency steps to take if there is a fire.

## SAFETY PRECAUTIONS

The following basic safety precautions are required when caring for the patient undergoing an endoscopic procedure with the use of electrosurgery.

- Inspect cords and electrosurgical unit before use
- Test audible alarms before use
- Assess the patient’s skin before and after electrosurgery use
- Place the dispersive pad over well-perfused muscle mass, and avoid prosthetics and tattoos
- Never alter a dispersive pad – do not cut or fold
- Place dispersive pad as close as possible to the operative site
- Use the lowest setting possible on the electrosurgical unit (2) (4)
- Do not bundle multiple cords together on the surgical field (2)
- Confirm power settings with physician
- Clean electrode tips to prevent the buildup of eschar (2) (4)
- Endoscopy personnel should be knowledgeable about the principles of electrosurgery, risks, complications, and corrective actions.

**Utilization/Application of Electrosurgery Units in the Endoscopy Suite**

Electrosurgical units including Argon Plasma Coagulator, Bipolar Unit, and Heater Probe Unit, are critical devices used in the endoscopy setting. They are used for hemostasis, polypectomy, sphincterotomy, and ablation of diseased tissue (7) (9). This instrumentation is also amongst the most hazardous used in the endoscopy unit, thus it is vital the endoscopy staff is well informed and versed not only in the basic principles their use, but the safety precautions needed (7).

As in the operating room setting, an ESU can be found in any endoscopy suite. This device is used to remove polyps from the gastrointestinal tract using various accessories such as wire snares and hot biopsy forceps. Through these accessories, the polyp is separated from the gut lining using a blend of cut; the cell explodes due to the intracellular water vaporizing due to the increased temperature, and coagulation; where the cells further away from the heat source become dry and shriveled as the intracellular water heats up and leaks out of the cell (7). The ESU is typically used on polyps that are 6-25 mm in size. Smaller polyps around 4-5 mm are usually removed “cold” - ESU is not utilized to provide heat therapy (8).

The Food and Drug Administration (FDA) views ESU settings the same as writing a prescription, therefore the endoscopist should be determining the settings (10). The settings of the ESU may be influenced by the patient's co-morbidities, pathology, size and invasiveness of the lesion, the patient's medications and lab results and the effectiveness of the bowel preparation, although this list is not conclusive. The endoscopy staff needs to verbally confirm the settings with the endoscopist before activating the ESU, and this information needs to be documented in the patients' record, as well as the device serial number, the settings used, and the location of the dispersive pad on the patient (10).

Research is being undertaken to see if using "pure cut" as opposed to a blend of cut and coagulation has a decreased risk of post polypectomy bleeding. Research has demonstrated pure cut can be used for polypectomies with an associated bleeding rate as seen in those polypectomies where a blend of cut and coagulation was used. However, if the pure cut is used, a hemoclip placement to the polypectomy site is highly advised (12).

**Endoscopic Retrograde Cholangiopancreatography (ERCP)**

The ESU is also utilized during Endoscopic Retrograde Cholangiopancreatography (ERCP). It is used to make an incision (sphincterotomy) into the Papilla of Vater and the fibers of the Sphincter of Oddi (the end area immediately following where the common bile duct and pancreatic duct join to empty into the duodenum). Sphincterotomy is used for therapeutic interventions. All safety concerns regarding the ESU discussed above apply during this procedure, including placing the ESU into standby mode once the sphincterotomy is completed (9).

A complication of ERCP is pancreatitis, and current research is underway to see if the use of ESU under different settings (pure cut versus a blend of cut and coagulation) can decrease this risk. Research has demonstrated the type of current used does not alter or decrease the risk of pancreatitis. However, pure
cut ESU has shown an increased risk of bleeding from the sphincterotomy site. All ESU settings should be based on the endoscopist's preference and verbal order (10) (11).

**Bipolar Electrosurgery**

The bipolar electrosurgical unit and accessory devices are valuable tools in any endoscopy setting. Accessory devices are defined as the instrumentation used to deliver the electricity. Bipolar electrosurgery is used for hemostasis within the gastrointestinal tract and is indicated for active bleeding from such areas as ulcers, polypectomy sites, and arteriovenous malformations. It is also used for the treatment of hemorrhoids or to destroy diseased tissue. There are many advantages to the use of bipolar electrosurgery. The bipolar electrosurgery does not require the use of a dispersive pad, thus making it safe for patients with implantable devices. The other advantages to bipolar electrosurgery cautery unit include limited tissue penetration thus decreasing the risk of perforation. In this situation, the energy disperses rapidly; the thermal energy (heat) can be applied from the tip of the accessory probe, or through its sides, thus producing less injury to the site being treated. Therapeutic agents such as Epinephrine® can be injected at the same time when using certain accessory devices. The bipolar device and its accessories are also relatively inexpensive when compared to laser therapy (9).

Complications do arise with the use of the bipolar electrosurgical unit, including perforation of the area being treated, deep ulcerations due to thermal injury, and delayed bleeding. The bipolar electrosurgical unit should not be used with patients who are uncooperative or combative, are experiencing massive bleeding (visualization of the site is poor or non-existent) or if "free air" is confirmed on radiographic studies (9). The patient's abdomen should be monitored frequently for distention during and post procedure. As with the ESU, the physician should determine the bipolar electrosurgical unit's settings and this should be documented in the patient's record, as well as the serial number of the unit used.

There are limited devices available for use with the bipolar cautery unit that can be used for polypectomies and sphincterotomies. These devices are difficult to engineer and are very expensive so the bipolar cautery unit is rarely used for these therapies. This is disheartening from a safety standpoint as concerns with implantable devices are minimized with the use of bipolar cautery units (8).

**Heater Probe**

The Heater Probe (HP) also falls into the category of bipolar devices as its use is very similar to that of a bipolar electrosurgical device. The probe itself is composed of aluminum, which has a high thermal conductivity capability to provide a precise distribution of heat to the area being treated. The disadvantage to the HP is the length of time for the device to deliver the thermal energy--up to 8 seconds, which can seem like an eternity in an ever-moving gastrointestinal tract. The HP must also be allowed to cool before the probe is removed through the endoscope as the endoscope's working channel can be burned or melted by an uncooled probe (9).
ARGON PLASMA COAGULATOR (APC)

The argon plasma coagulator (APC) has been used in the United States since 1997 and is a monopolar unit. The APC is used for superficial hemostasis and tissue ablation (7) (8). Ionized argon gas is used to conduct the energy to the tissue to be treated whereas the non-ionized gas outside the argon does not, thus placing the energy directly to the tissue. This results in rapid coagulation and formation of an eschar that is resistant to rebleeding and heals rapidly (7). APC is used for the treatment of vascular ectasia which includes arteriovenous malformations (AVM's) and gastric antral vascular ectasia (GAVE) (9). APC is also used to treat radiation proctopathy, Barrett's Esophagus (the esophageal tissue containing cells from the stomach that have the potential to lead to esophageal cancer), and for the ablation of residual polyp tissue after snare polypectomy of large, sessile adenomatous (benign) polyps (9).

All APC settings are physician driven, but usually fall between 40-60 Watts with an argon gas flow rate below 2 Liters/minute (8). If tissue is to be ablated, a higher power setting of 70-90 Watts may be used. If the APC probe touches the tissue, a potential complication of "emphysema" may occur, where the argon gas is forced into the wall of the colon or stomach and then the gas may migrate to other areas of the body. Other complications of APC use include embolism (argon gas blocks a blood vessel) and perforation (argon gas leaks into the abdominal cavity, as well as gastrointestinal tract secretions) (8) (10). As the APC is a monopolar unit, complications from the improper use of the dispersive pad can also occur, as previously discussed.

ELECTROSURGICAL SAFETY IN THE ENDOSCOPY SUITE

ELECTRODE PLACEMENT

Safety issues for the patient during the use of ESU during endoscopic procedures are the same as for the patient undergoing surgery. For use during colonoscopy, the preferred site for the dispersive pad is the upper right thigh as the patient is usually in the left lateral position (9). Patients may be turned frequently during colonoscopy so it is of vital importance to assess the position of the dispersive pad after movement. A new pad may need to be applied if there has been any change in the pads position or if it has pulled away from the skin. For upper endoscopy procedures such as Esophagogastroduodenoscopy (EGD), Endoscopic Retrograde Cholangiopancreatography (ERCP), or Small Bowel Enteroscopy, dispersive pad placement has a suggested placement on the right flank or right upper arm (7). Dispersive pads should be placed as close to the site being examined as possible (7). Avoidance of certain areas should be practiced when placing the dispersive pad on a patient. Do not place a dispersive pad over scars, implants, broken skin, excessively hairy areas, or tattoos (10). The patient's jewelry should be removed; ESU manufacturers recommend the removal of all jewelry, pierced and non-pierced. An inadvertent tissue injury can occur, especially if the jewelry is in the circuit's pathway (10).

BOWEL EXPLOSION

Careful monitoring of the active electrode cord must be practiced. The active cord is the link between the ESU and the accessory used to remove the polyp. Best practice is to disconnect the active cord from the accessory device when the accessory is not in use and/or place the ESU in the standby mode. This will prevent accidental burns or shock to the patient or staff member if the footswitch is inadvertently engaged while the cord is still connected to the accessory device. The active cord itself, or the accessory device with the active cord attached should never touch or cross over cardiac leads or monitors. This can lead to severe burns on the patient (8) (10).
A colonic gas explosion may occur with the use of electrosurgery or other cautery devices during colonoscopy. Risk factors to observe for before the use of these devices include poor bowel prep results (the colon still has stool in it) or the use of a bowel prep that is sugar based, such as Mannitol® (13). Therefore, it is important for the bowel to be as clean as possible and for the endoscopist to suction colonic gas before the use of ESU or other cautery devices (7) (13).

**Implanted Cardiac Devices**

There are an increasing number of patients seen in the endoscopy setting who have implanted cardiac devices. Although newer pacemakers are designed to be resistant to electrical interference, the pacemaker may still see electric cautery as cardiac activity, and may not initiate a heartbeat. The battery life may be affected or an Automatic Internal Cardiac Defibrillator (AICD) may trigger an inappropriate therapy in the presence of ESU or other monopolar cautery use (7) (9). It is highly recommended each endoscopy unit have a protocol in place to follow for the treatment of the patient with an implanted cardiac device (7). Care of the endoscopy patient with such devices should include a thorough assessment including a medical history, the type of device implanted, where, when and who implanted the device. Resuscitation equipment, including a defibrillator should either be in the procedure room or directly outside the room, and the patient needs to be placed on a cardiac monitor throughout the procedure. The physician should use the lowest setting possible on the ESU, and the ESU should be placed in the standby mode when not in use (7) (9).

**Other Implant Devices**

The endoscopy staff should also question patients about any implant, including insulin pumps, cochlear implants, devices that infuse medications constantly, nerve stimulators and gastric stimulators. A simple question such as “Do you have anything implanted in your body?” This question should also give you an answer to joint replacements, as well as devices that run on a battery. The ESU can severely damage these devices. The endoscopist should be made aware of the presence of implantable devices before the use of ESU (10).

**Contraindications**

Although serious complications from the use of the ESU in endoscopy are infrequent, it is important to know that patient burns, perforations, hemorrhages, and bowel explosions have been reported. ESU complications reported between 2001 and 2002 were mostly related to operator or accessory device error (8).

Electrosurgery is contraindicated in the endoscopy setting under certain conditions. As previously discussed, a poor bowel preparation due to the presence of hydrogen or methane gasses in the colon is one of these conditions. Other contraindications include a non-cooperative or combative patient who are unable to lie still and a poor visual field where the staff cannot see the area being treated, either due to anatomy, spasms or a poor bowel prep (7) (9).
CONCLUSION

The ESU and other electrosurgical devices are crucial and important tools in the endoscopy setting that are used for therapeutic modalities, and to save patients’ lives. The devices are used to remove polyps, control bleeding and ablate diseased tissue. These devices are accompanied with issues and concerns that must be addressed for patient safety. Many surgeons have no formal education in the use of ESU and other electrosurgery devices in the OR. It is the responsibility of the endoscopic staff to be educated about the ESU and devices for the safety of our patients—we are the patients advocate when they are at their most vulnerable.
REFERENCES


10. Alexander, M. Basics of electrosurgery and argon plasma coagulation use and safety; ERBE, USA, Inc. SGNA 2006 Regional Conference October 28, 2006 Atlantic City, NJ


Directions: Circle the best answer.

1) Which of the following concepts are included in the principles of electrosurgery?
   a. Electricity
   b. Current
   c. Voltage
   d. All of the above

2) Electricity always follows the path of least resistance.
   a. True
   b. False

3) ________ is the most commonly used electrosurgical mode.
   a. Monopolar
   b. Bipolar
   c. Heater probe
   d. Argon plasma coagulation

4) Bipolar electrosurgery uses electrical current where the circuit is completed by using two parallel poles located close together.
   a. True
   b. False

5) Which of the following electrosurgical modes are used in the Endoscopy setting?
   a. Argon Plasma Coagulator
   b. Bipolar unit
   c. Heater probe
   d. All of the above
6) For patient safety, the endoscopy nurse must verbally confirm the electrosurgical settings with the endoscopist before electrosurgery activation.
   a. True
   b. False

7) For patient safety during colonoscopy, the preferred site for the dispersive electrode is:
   a. Left upper thigh
   b. Right upper thigh
   c. Left calf
   d. Right flank

8) It is safe to place the dispersive electrode pad over tatoos.
   a. True
   b. False

9) The dispersive electrode pad can be altered (cut or folded) to fit an elderly emaciated patient.
   a. True
   b. False

10) The following safety precautions are required when caring for the patient undergoing an endoscopic procedure using electrosurgery. Choose the incorrect precaution.
    a. Test audible alarms before use
    b. Assess the patients skin before and after electrosurgery use
    c. Use the highest setting on the electrosurgery unit
    d. Confirm power settings with physician
Your opinion is important to us. Please answer the following questions by circling the response that best represents your experience.

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<tr>
<th>COURSE OBJECTIVES &amp; CONTENT</th>
<th>Strongly Agree</th>
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<th>Neutral</th>
<th>Disagree</th>
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<td>1. The activity was valuable in helping me achieve the stated learning objectives.</td>
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<td>2. The number of credit hours was appropriate for the content.</td>
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<td>4. The teaching/learning methods, strategies, and slides were effective in helping me learn.</td>
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<td>9. Overall, I am pleased with this activity and would recommend it to others.</td>
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<td>10. The content was presented free of commercial bias.*</td>
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<td>11. Did the material presented increase your knowledge and/or understanding of this topic? *</td>
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* If you responded “No” to question 10, please explain why:

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* If you answered “Yes” to question 11, what change do you intend to make?

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What barrier, if any, may prevent you from implementing what you learned?

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Cite one new piece of information you learned from this activity:

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Additional comments/suggestions:

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With my signature I confirm that I am the person who completed this independent educational activity by reading the material and completing this self evaluation.

Signature: ____________________________________________ Date: ______________________
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In order to receive a certificate with contact hours you must read the information, complete the evaluation form and the post test. Send the evaluation and post test to Corexcel, 201 Webster Building, 3411 Silverside Road, Wilmington, Delaware 19810. We will mail you the certificate within two weeks after we receive your paperwork. Thank you for ordering this self-study packet and if you have any questions you may contact our office at 1-888-658-6641.

Accreditation

Corexcel is accredited as a provider of continuing education in nursing by the American Nurses Credentialing Center’s Commission on Accreditation.

Corexcel has been accredited as an Authorized Provider by the International Association for Continuing Education and Training (IACET).

Accreditation refers to recognition of continuing nursing education only and does not imply Commission on Accreditation approval or endorsement of any commercial product.

Diabetes Educators: The National Certification Board for Diabetes Educators (NCBDE) has recently announced that ANCC Accredited and Approved Providers have been approved by the NCBDE as providers of continuing education. Individuals seeking re-certification from the NCDBE can use continuing education contact hours received through attendance at an activity provided by an Accredited or Approved Provider of ANCC to meet the continuing education requirements for re-certification established by the NCDBE.

Take the Gastrointestinal Endoscopy Course Online

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WRITTEN PROGRAM REGISTRATION FORM

Date: ____________________

Name & Title: ______________________________________________________________________

Address: _________________________________________________________________________

City: _______________________________  State: ______   Zip: _____________________________

License No. (Required for Florida):  ___________________________________________________

Email: ____________________________________________________________________________

Employer: ________________________________________________________________________

(W) # ____________________________  (H) #__________________________  (F) # _________________

Have you registered with us before? ________________ Yes    ____________  No

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Total: $28.95

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