ENDOSCOPIC MUCOSAL RESECTION

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What is EMR?

EMR by definition is an endoscopic resection technique that involves removal of large areas of flat or relatively flat mucosa. As techniques have varied, several European authors now use the term endoscopic resection or ER to encompass EMR as well as endoscopic submucosal dissection (ESD). The problem has been that these technologies have begun to blend together. EMR and ESD used to be separated by the use of a snare for EMR and the use of a dissection knife for ESD. ESD using a knife generally has significantly more complications than EMR.[1] However, a number of endoscopists now will use ESD with a knife and finish with a snare when the resection is nearly complete.[2] This has led to the term ER if there is any endoscopic removal of tissue.

These techniques have all evolved from earlier techniques of saline assisted polypectomy developed for more sessile polyps.[3] All of these techniques have certain features in common, including the ability to resect larger areas of mucosa that cannot be grasped with a snare.

First Principle of Endoscopic Resection: Identify the Lesion

It is important to be certain that what you are resecting is a neoplastic lesion. There are certain to be cases of misidentification, but one can usually identify the abnormal lesions by their appearance on white light but it is usually easier using NBI. Neoplastic lesions have two common features — a disordered capillary system so that the loops do not appear regular and irregular mucosa as the surface glands vary in size and shape.[4]

Second Principle of ER: Lift the Lesion

Critical to all mucosal resection techniques is the ability to inject a lesion with a submucosal injection. It is not required with the EMR banding technique but it is with all of the other ER techniques. It does give information regarding the risk of perforation; non-lifting really precludes the ability to resect except in rare instances. Non-lifting lesions also cannot be suctioned for banding. If the lesion lifts poorly, it often helps to use the cap EMR technique as opposed to the banding EMR. This is because the cap has a pre-positioned snare on the distal end of the cap which allows removal of smaller areas of mucosa.

Third Principle: Suctioning

The most common ways to perform endoscopic resection is either using the band ligation technique or cap technique. Both of these techniques involve the use of suction through an endoscope with a friction fitted cap to create a pseudopolyp. The suctioning must obtain enough tissue to either allow a snare to close on the polyp or a band to capture the tissue much like a band captures an esophageal varix. Suction should be done to move the tissue at least two-thirds of the way up the barrel of the cap or banding device to allow tissue capture. This can be accomplished by the use of the multiple suctioning attempts.

Fourth Principle: Applying the Snare, Tugging, and Cutting

In cap EMR, the most challenging part of the procedure is to place the crescent snare around the distal lip of the cap. After this is achieved, closing the snare around the pseudopolyp is not difficult. With the banding system, the snare can be applied above the band, below the band, and potentially through the band. The tissues are generally retrieved after multiple resections are performed using an endoscopic polyp retrieval basket. Since this technique requires that the tissue be easily movable to suction into the cap, this technique is really the best when the patient is naïve to prior treatment or even recent biopsies.[5] The fibrosis after prior procedures decreases the ability to perform ER. After six bands have been used, either a new banding system needs to be used or ER is terminated. The band technique is best for widespread mucosal resection because with practice, side by side resections can be performed without leaving tissue in-between resections which is much harder with the cap technique.

Before the resection is performed in the cap technique, the snare is customarily used to tug on the mucosa to ensure the entire gastrointestinal wall does not move. If the entire wall appears to flex, this is unlikely to be a situation where ER can be performed without great difficulty. The band technique does not really require this as the bands tend to stay above the muscularis propria unless mucosal scarring is present.

Lastly, if during the resection the patient experiences substantial discomfort, consideration should be given to discontinuing the resection as the pain could represent injury to the adventitia and can be associated with near or actual perforation.

Fifth Principle: Orient Tissue for Pathologist

It is important for the mucosal resection specimen to be oriented for the pathologist to allow adequate processing. Deep and lateral margins must be determined by "breadloafing the specimen" so that the clinician can gauge the depth of invasion and whether the lesion was completely removed.[6] In the case of early cancers, angiolymphatic invasion, poor differentiation, and submucosal involvement are critical.[7] Lateral margins that are positive will need to be excised at an early future endoscopy session.

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