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RECENT ADVANCES IN DIAGNOSTIC COLONOSCOPY IN PATIENTS WITH COLORECTAL CARCINOMA

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Abstract:

The primary objective of colonoscopy is to determine and cut out the pre-cancerous lesions. Failure to find and remove polyps and early cancers results in a delayed cancer diagnosis and treatment, with the potential for poor patient outcomes and the risk of litigation [1]. The delayed diagnosis and treatment results in failure to spot and cut off the tumor with the potential for poor patient outcomes and the risk of litigation. From recent years, industry has doing aggressive training for better up gradation to magnify the execution of augmented endoscopy. The term augmented endoscopy contains many innovations. The augmented endoscopy comprise of optical filtering, topical dyes, zoom magnification and could be used for many other gastrointestinal lesions. For example minute structure of crypts on the mucosal surface and superficial micro-vessels [3,4,5] This type of advanced endoscopic has come up with new instruments for identifying the abnormalities in the size, density, and shape of crypts and vessels in either the normal colon or a tumor lesion. For colorectal screening and diagnosis, colonoscopy is a universally accepted method

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INTRODUCTION:

The primary objective of colonoscopy is to determine and cut out the pre-cancerous lesions. Failure to find and remove polyps and early cancers results in a delayed cancer diagnosis and treatment, with the potential for poor patient outcomes and the risk of litigation [1]. The delayed diagnosis and treatment results in failure to spot and cut off the tumor with the potential for poor patient outcomes and the risk of litigation. From recent years, industry has doing aggressive training for better up gradation to magnify the execution of augmented endoscopy. The term augmented endoscopy contains many innovations. The augmented endoscopy comprises of optical filtering, topical dyes, zoom magnification and could be used for many other gastrointestinal lesions. For example minute structure of crypts on the mucosal surface and superficial micro-vessels [3,4,5] This type of advanced endoscopic has come up with new instruments for identifying the abnormalities in the size, density, and shape of crypts and vessels in either the normal colon or a tumor lesion. For colorectal screening and diagnosis, colonoscopy is a universally accepted method [6]. The endoscopists may fail to identify up to 6% of adenomas with the size of less than or equal to 10mm in size or almost 25-30% of all tumors specifically when using whitelight colonoscopy. Could be due to location of the lesion, the skill of the endoscopists and the image contrast of the endoscopic picture. Augmented endoscopy, enhancing the endoscopic appearances of colon lesions, has the potential to improve detection and differentiation of colon neoplasms from other lesions [11]. For the diagnosis of colon neoplasia, the clinical trials has been testing to evaluate the usefulness of endoscopy for the diagnosis and there have been many conflicting results. [12] This may be limited to each technology and its variation in the diagnostic skill of participation.

Fujiya and Kohgo have reported that 2 factors needed to evaluate which are linked with the adequacy of these novel technologies: the primary factor is application of the technology for diagnosis of colon neoplasms which could include detection, differentiation or staging and on which level of experience the technology has being applied by the endoscopists [13]. Judging the technology only is not enough to ensure optimal results and to achieve the best outcome.

Which endoscopists method has being used and other variables influencing the detection of endoscopists are two important things.

These include the operator's experience, bowel preparation, examination technique and the use of instruments or devices able to increase visual identification.

The endoscopist's skill:

Recent studies clearly show that patients examined by colonoscopists with a low adenoma detection rate (ADR) have an increased risk of unexpected cancer in the 3 year period after colonoscopy compared with those examined by colonoscopists with a high adenoma detection rate [14]. Therefore ADR has been accepted as essential colonoscopist performance benchmark and may be used in the future for credentialing and recognition of practice rights/payment guarantee. The American guidelines recommended that for average risk (>50 years) screening colonoscopy patients have achieved an ADR of >25% for men and 15% for women [15,16]. In the British Bowel Cancer Screening programme an ADR of >35% is expected for faecal occult blood test screenees over the age of 60 years. It may not be possible with current techniques and technology to reduce the miss rate to zero but to optimize performance a number of factors must be addressed.

Bowel preparation:

There is an association between the tumor detection rate and bowel preparation. For more frequently a complete examination and improved levels of satisfaction for endoscopist and patient there must be good bowel preparation. [17]. When optimizing bowel preparation certain general principles apply. Clear instructions and support should be given through a telephone communication. Recent advancement has contains text message reminder and specially designed computer applications to guide the process. Many regimens encourage 1– 3 days of dietary (low fibre intake) prior to the bowel preparation. Individuals with previous history of poor bowel preparations, and may have delayed their session for many times require special attentions and need more hospital supervision. Patient preference for bowel preparation should also be taken into account as a previous poor experience with one preparation may not occur with another. The preparation instructions should always include advice for the patient to attend one hour before the scheduled appointment if it is felt that the preparation has not worked satisfactorily, so that a phosphate enema can be given if needed. Despite all best endeavours there will still be a small percentage. [18]

New instruments and devices:

More effective and easier techniques has been introducing from past years.

The Third Eye Retroscope is an auxillary imaging device that is passed through the biopsy channel of the colonoscope and is recurved in front of the tip of the 'scope to provide a separate backward pointing video image, which complements the standard forward view and allows near 360 degree visualisation. During initiative trials significantly more lesions and adenomas (11–25%) were seen on the proximal side of haustral folds than with a conventional forward view [19]. An alternative is to increase the angle of view of the conventional colonoscope lens which currently provides a 140 degree field of view.

High resolution and zoom–magnification endoscopy:
Standard-resolution and high-resolution endoscopes magnify the endoscopic image 30 to 35 times. The zoom magnification endoscopes have the capability to perform optical zoom which has a moveable lens at the tip of endoscope. A semi-transparent lid may be used to fix the focal length between the lens and target tissue to enhance quality of image [20]

Optical zoom obtains a closer image of the target while maintaining image display resolution.

It has differentiated from electronic magnification, which simply moves the image closer on the display and results in a decreased number of pixels that compose the area of the display, with no improvement in resolution. Depending on the size of the monitor zoom endoscopes can magnify images up to 150 times [21].

Chromoendoscopy:
Chromoendoscopy refers to the topical application of stains at the time of endoscopy in an effort to enhance diagnosis of neoplastic lesions (particularly non polypoid flat and depressed lesions), tissue characterization and differentiation [22]. For chemoendoscopy the stains which are used classified as contrast, absorptive (or vital), and reactive.

Contrast stains, such as indigo carmine, seep through irregularities and pool in crevices in the surface of the polyp to highlight the mucosal features. Absorptive stains, such as crystal violet, identify specific epithelial cell types by preferential absportion or diffusion across the cell membrane. Absorbtive chromoendoscopic techniques require pretreatment and removal of excess mucus from the mucosal surface using N-acetylcysteine solution (4% up to 10%). Chromoendoscopy with non-absorbed indigo carmine is a classic technique and still one of the best for enhancing the margin and surface pattern of colonic lesions. Pan-chromo colonoscopy improves the detection of adenomatous polyps in several studies [23]. Targeted chromoendoscopy also facilitates the detection of colorectal neoplasms, particularly the flat and depressed type. Chromoendoscopy with magnification is capable of differentiating adenomas from non-neoplastic polyps by analyzing the surface structure of mucosal crypt openings [24]. Nevertheless, it seems to be one of the most reliable endoscopic methods for the differentiation between non-neoplastic and neoplastic colorectal lesions.

The study has concluded that some major polypoid and non polypoid lesions are missed at colonoscopy which minimizes the effectiveness of cancer prevention. When evaluating the quality of colonoscopy, the adenoma detection rate has emerged as a key performance indicator and all colonoscopists should monitor and be aware of their adenoma detection rate. If the ADR is unacceptably low they should be prepared to undergo additional training. Good bowel preparation, optimal examination technique and an understanding of subtle lesion appearances are fundamental to reducing lesion miss rates. New instruments, devices, and technologies that enhance or widen the field of view can often be employed in combination and offer realistic possibilities for easier and more accurate examinations in the future.

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