REVIEW OF LITERATURE
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In the early centuries of civilization students of human anatomy and disease devised methods to project their curious, if not scientific vision beyond the orifices of the body cavities. It is recorded that the ancient HEBREWS evolved a practical speculum for examination of the vaginal canal and the ruins of pompeii revealed that a technique of anorectal examination utilizing an expanding type of anal speculum was employed even in those days.

Medical literature reveals that interest in the study of inner recesses of the human body did not abate. Through the years, the curious were relentless in their investigations into the internal regions of less accessible cavities. However, it was not until 1805 that Phillip Bozzini of Frankfurt invented an instrument to project the light of a candle through a double lumen urethral cannula for inspection of the inner surfaces of the urethra and bladder. The only reward for this investigator's unusual curiosity was a reprimand from the faculty of the medical academy in Vienna.

Satisfactory inspection of cavities with small orifices required inventive assistance to make possible the introduction of a source of light. During the
following 75 years numerous unsuccessful attempts were made by many scientists and technicians to perfect an instrument for adequate telescopic examination. Development of incandescent light in 1880 made possible the modern lighted telescopes, which has since been developed to such a high degree of excellence.

The era of internal illumination of the body cavities began in 1878 with the introduction of the cystoscope by Max Nitze.

Edison (1880) invented the incandescent lamp and Newman (1883) described an instrument using the incandescent lamp as a light source.

At the end of nineteenth century cavity endoscopic procedures such as cystoscopy, bronchoscopy etc. were well established and in daily use.

The quest of the clinicians to look inside the anus during the above era of endoscopy led to the birth of sigmoidoscope.

The sigmoidoscope has become one of the important tools of this armamentarium (Paulson, 1930).

Sigmoidoscopy is the single most important diagnostic method for the patients with colonic diseases (Isselbacher and Richter, 1983). This holds
very much true for the colonic cancers. The authenticity of the above finding can be justified by the fact that:

a. Approximately 50% of the large bowel malignancies are within the reach of sigmoidoscope.

b. Small rectosigmoidal tumors may be missed on examination after a barium enema because of tortuosity and redundancy of the intestine in this area.

It's diagnostic superiority has also helped in determining the cause of unexplained rectal bleeding (Gaisford, 1978 and Teague, 1978).

Of the 215 patients in whom sigmoidoscopy was successfully performed by Teague et al (1978), the probable or definite cause of the bleeding was identified in 89 (41%). This included 27 patients i.e. 13% with a carcinoma, 29 (14%) with colonic polyps and 16 (7%) with previously undiagnosed inflammatory bowel disease. 196 patients i.e. 91% presented with frank rectal bleeding and only 19 patients i.e. 9 percent were investigated because of positive faecal occult blood.

If all the patients with suspected colonic lesions were subjected to sigmoidoscopy on the first physicians' visit, the earlier diagnosis of these lesions would almost certainly improve the long term outlook for colonic cancer.
Donald et al (1985) found a total of 516 abnormalities to account for symptoms in 506 patients giving a diagnostic rate of 35 percent. The most common lesions were piles (307 cases). Other relatively common disorders included inflammatory bowel diseases (107 cases) (7.3%), Benign tumors (44 cases) and malignant tumors (38 cases). 33 patients with a rectal carcinoma subsequently under went surgery, the tumors being staged by Dukes classification, 9 were stage A (27%), 8(24%) stage B and 16(49%) stage C. The other abnormalities included angiodyplasia (8), solitary rectal ulcer (6) and fissure (4) Radiation colitis (1) and thread worm(1).

Sigmoidoscopic and radiologic studies of the bowel are most important in establishing the diagnosis of inflammatory bowel diseases of the large intestine (Netri et al, 1980). Sigmoidoscopy must be performed in all patients presenting with chronic diarrhoea and in all instances of rectal bleeding, while barium enema examination of the perfectly prepared colon may disclose the earliest changes of mucosa in ulcerative colitis (Zijlstra, 1982).

A conventional barium enema is often normal in early disease. The goal of sigmoidoscopy is to establish whether mucosal inflammation is present and not necessarily to determine it’s full extent at the initial
examination.

Thus if sigmoidoscopic changes are encountered within the first 8-10 cm, it is not necessary to pass the instrument to its full length which may cause discomfort when bowel is acutely inflammed (Robert-Glickman, 1987).

Bolt (1970) has reported that routine sigmoidoscopic examination resulted in discovery of single or multiple polyps in 9.6 percent and asymptomatic cancer in only 0.2 percent of patients, examined.

In a series of 14,370 routine initial examinations, Gilbertson (1968) reported the findings of 20 carcinomas or 1 in 712. Other studies have confirmed the findings of 1-3 cancers per 1000 routine examinations (Bohlman et al, 1977).

Only 12 to 13 percent of tumours of colon and rectum are within the reach of examining finger. If 20 cm of colon and rectum can be visualised with sigmoidoscope, 65 percent of all tumours of the colon and rectum can be seen and if only 15 cm can be visualised 50 percent of all tumours of the colon and rectum can be brought into view.

Leffall (1974) and Rossato et al (1981) also emphasized that roughly half of all colorectal carcinomas are found within the reach of the rigid
sigmoidoscope. A further quarter occur below the mid descending colon and may therefore be detailed by fibroptic sigmoidoscopy (Marks et al, 1979).

All agree, however, that sigmoidoscopy is indicated in any patient with symptomatology referable to colon and rectum especially and highly significant bleeding per rectum. Other authors, because of mounting evidence for a polyp cancer relationship, hold the merit of routine sigmoidoscopic examination in screening for carcinoma of the colon. They base this judgement on the high incidence of carcinoma and on the potential for complete cure if diagnosed very early when only mucosal involvement is evident. Proponents of this view argue that:

1. Benign polyps are common found in patients with carcinoma of the colon.
2. Carcinoma is sometimes seen in continuity with benign tissue within a polyp.
4. Hereditary multiple adenomatous colonic polyps carry nearly 100 percent risk of carcinoma.
5. Larger the size of the polyp, the more likely it will be cancerous.
The wide spread application of rigid sigmoidoscopy and pains-taking work of Morson (1976) and others (Lane et al, 1979) have identified the importance of adenomatous polyp in the genesis of colorectal cancer. Mass screening studies using the rigid sigmoidoscope have shown that the removal of all asymptomatic polyps found at routine sigmoidoscopy will result in both, a decline in the incidence of rectal cancer and improved survival of those who develop malignancy. Patients in whom colorectal cancer has been detected at an asymptomatic stage have been reported to have survival rate as high as 90 percent at 15 years (Hertz, 1979).

Further-more one study by Crespi et al (1979) has suggested that the removal of polyps can reduce the incidence of carcinoma of colon.

Lipshutz et al (1979) and other supporters of routine sigmoidoscopic screening of asymptomatic patients concluded that it is justified despite objections to the poor cost benefit ratio in diagnosing large bowel cancer.

Corman et al (1975) have recommended that sigmoidoscopy should be performed annually for any patient who had a history of rectal polyps or carcinoma.

For patients 50 years or older, sigmoidoscopy
should be performed routinely every two years in accordance with the data presented by Spratt (1970), who stated that doubling time for carcinomas of colon is in excess of 600 days, thus implying that routine annual examinations are not indicated.

Wolff and Shinya (1974) have also advocated for earlier detection of cancer of colon through endoscopy.

On the other hand there are chances when lesion can be missed on sigmoidoscopy. There were 94 cases of polypoid colonic lesions from a study of Roscoe E Miller (1975), where sigmoidoscopy failed to identify any of these polyps even though the sigmoidoscope was at or beyond the site of the lesions. Twenty five of the lesions were carcinomas. Histologic proof of each lesion was obtained by repeat sigmoidoscopy with biopsy, polypectomy or surgery.

Incomplete examination obviously accounts for the failure to identify colonic lesion by sigmoidoscopy in many cases. The reported false negative error rate for polypoid lesions has ranged from 3 to 22 percent with an average of 12 percent (Leinick et al, 1977 and Abrahams, 1982).

The greatest assets of sigmoidoscopy are there of combined biopsy and polypectomy with minimal additional time, cost and patients' risk.
Sigmoidoscopy also fails occasionally to detect carcinomas of colon with an error rate reported as high as 10 percent (Abrams, 1982).

Two recent reports showed approximately 17 percent sigmoidoscopies fail to visualise colonic malignancies (Obrecht et al, 1984 and Benner et al, 1983).

The various results reported for the radiologic detection of colonic lesions particularly polyps is mainly dependent upon the competence of the radiologists involved. The similar dependence upon examiner competency during sigmoidoscopy has not received equal attention even though marked variability in training and experience is evident among clinicians currently performing sigmoidoscopy, implying that the results of this technique are likely to be at least as variable as those reported for the radiologic examinations (Max et al, 1982 and Overholt, 1984).

Hughes (1957) stated that 25 percent of sigmoidoscopies fail to go to the full length of 25 cm which Jackman (1958) quotes 14.8 percent of failure in 19,294 examinations at the Mayo Clinic in 1955. The average length of insertion achieved by Bohlman (1977) was 20.4 cm. In 62 percent of all the cases, he could pass full 25 cm of the instrument.
The recent introduction of fibreoptic sigmoidoscopy is a helpful diagnostic addition in the detection of cancer of colon (Simon, 1980). However, the expense of this examination is far greater than that of a barium enema and the numbers of instrument available as well as of skilled physician to use them, it quite limited.

Leister et al (1982) claimed the flexible sigmoidoscopy as an out patient procedure. Reynolds (1983) has also shown it's efficacy and simplicity of use of outpatients departments.

In the last decade, there has been lot of comparative studies claiming the superiorities of fibreoptic sigmoidoscopy over the rigid sigmoidoscopy (Vellacott et al; 1982; Katan et al, 1979; Broun,1984; Rodney, 1986; Vellacott et al, 1981, Bohlman et al,1977).

The superiority has been because of it's more reach and high ability of manipulation. It has got a great role in the diagnostic evaluation of paediatric age patients with colonic problems(Enler et al, 1981).

Nitri et al (1980) has used for the diagnosis of inflammatory pathologies of large bowel.

Donald et al (1985) showed the feasibility of offering an open access sigmoidoscopy services to general practitioners and insisting on a
sigmoidoscopy before a barium enema.

Many patients with inflammatory bowel diseases are most of the time not referred to the gastroenterology clinic. It is presumed that they were mild cases and were managed by general practitioner.

The incidence of inflammatory bowel disease was perhaps high, however, amounting to 102 cases/$10^5$ population/year. This compares with the estimated incidence of ulcerative colitis in Britain of 7.2 cases/$10^5$/year (Morris et al, 1968-77) and rectal Crohn's disease of 1.0 cases/$10^5$/year (Kyle et al, 1980 and Harries et al, 1982).

It has been observed that offering a rapid open access services of this type has not resulted in more clear evidence for detection of colonic carcinoma at an early stage. An alternative approach has been the wide spread use of occult blood testing. In patients with symptoms a yield for carcinoma of 4.6 percent has been reported (Leicester et al, 1983).

Unfortunately that approach still resulted in detection of only 11 percent of malignant tumours in Dukes stage A and or false negative rate for rectal carcinoma of 45.4 percent (Leicester et al, 1983). Hence possibly
a combination of sigmoidoscopy and occult blood testing will produce the best early detection rate for colorectal carcinoma.

There are advantages to the use of rigid sigmoidoscopy particularly at first examination. It is far quicker, can usually be carried out without bowel preparation and much larger biopsy specimens can be obtained. Inspections of the bowel stool without prior bowel preparations can also be of considerable value in that it may show blood streaking indicating a source of bleeding from a higher level or have the typical appearance associated with steatorrhoea or irritable bowel syndrome. Sometimes worms can be seen inside the bowel. Scrappings can also be taken which can show the cysts of protozoans parasites.

In certain instances of where the mesenteric occlusion is suggested, the diagnosis may be made or enhanced by sigmoidoscopy (Carter, Vanix, Hinshae and Stanfford, 1959; and Littman, Boley and Schwartz, 1963).

More accurate bacteriologic and parasitologic determinations are possible when smears are prepared and media inoculated promptly at table with the help of sigmoidoscope (Paulson, 1930; Paulson & Andrews, 1927).

Sigmoidoscopy has been also found to be
helpful in releasing large bowel obstruction (Thow and Jackman, 1963) and in the reduction of sigmoid volvulus (G'Connor, 1979).

Biggan and Arafa (1930) demonstrated the schistosonial rectal lesions with the help of sigmoidoscope.

The sigmoidoscopy has gained so much popularity due to it's reliability in the diagnosis that periodic health examinations and cancer detection surveys are considered incomplete without proctosigmoidoscopy (Crumpacker and Backer, 1961; Massler, 1967).

LIMITATIONS OF THE PROCEDURE

The limitations of sigmoidoscopy regardless of age, concern the restricted extent of direct visualisation. Nicholus (1982) has studied the extent of the examination by rigid sigmoidoscope.

Rectum is 12.5 (5") cm long, the sigmoid colon varies in length and position. In a complete examination in a non redundant sigmoid colon, the most that can be seen in 25-30 cm (10"-12") from the anus i.e. the rectum, rectosigmoid and lower sigmoid. In a redundant sigmoid colon, the instrument is threaded into loops, so that as much as 40cm may be
inspected with 25 cm (10") sigmoidoscope fully inserted. In complete passage of the entire length of sigmoidoscope, a rigid instrument occurs in 15% of cases (Jones Gummer and Jones, 1963).

Sigmoidoscopy has more limitations (Marss, 1974 and Stevenson, 1980). The examiner is unable to negotiate extremely acute bends and lesions may not be reached. Blind areas encountered most frequently are in rectosigmoid colon. Fixation and constriction of the colon from adhesions, inflammation, neoplasms and diverticula limit the skill of examiner.

The standard 25 cm rigid sigmoidoscope has been used in the evaluation of colorectal diseases for decades (Browne and Mc Hardy, 1948).

Inspite of its unquestionable value in the evaluation of patients with colonic problems serious limitations of this rigid instrument is that the average sigmoidoscopist inspects primarily the distal 15 to 18 cm of the colon (Madigan and Halls, 1968). Diverticular disease, strictures, localised inflammatory bowel diseases, polyps and colon carcinomas often occur more proximally in the colon, just beyond the reach of the rigid instrument. Previous studies indicated that perhaps 70 percent of colon cancers were located in the
distal 25 cm of the bowel and should be seen by this instrument (Bolt, 1971). Recent data however, suggest a major change in the distributions with a greater number of lesions above the level of rectosigmoid (McSwain et al, 1962; Axtell et al, 1966; Wolff and Shinya, 1974; Salmon et al, 1971; Koyana, 1974, Bohlman and Smith, 1976 and Berg and Howell, 1974.

COMPLICATIONS

In 1974, American Society of Gastro-intestinal endoscopy (ASGE) survey of complications relating to diagnostic sigmoidoscopy showed a morbidity of 0.32 percent and mortality of 0.008 percent (Rogers et al., 1975). In the more recent ASGE survey of 700 diagnostic sigmoidoscopies, the reported complications and fatality rates were 1.7 percent and 0.1 percent respectively (Gilbert et al, 1983). Apparently greater experience and improvement in instrumentation has not reduced the risk of sigmoidoscopy.

By far the most significant complication from sigmoidoscopical examination of the recto sigmoid is that of perforation (Andersen, 1947). Bolt (1971) has reported that perforation can be expected in from 0.002 to 0.07 percent of patients and that death resulting from the procedure in the asymptomatic individual should approach zero.
Others reported less frequent complications from procto-sigmoidoscopic examination and have been listed by Weiss (1972). They included cardiac arrest secondary to vaso-vagal reflex, post instrumentation and post biopsy bleedings, bacteraemia (Rattan et al, 1981). Rodríguez et al (1984) reported enterococcal endocarditis following sigmoidoscopy. Explosion of bowel gas where fulgurating current has been used without suction or without proper bowel preparation, fainting episodes secondary to vasomotor collapse, perforation by the sigmoidoscope and perforation due to preparatory cleaning or due to electrosurgery.