RETROGRADE COLONIC SPREAD OF ENEMATA IN ULCERATIVE COLITIS

BY

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Intrarectally introduced solutions are being increasingly used in the treatment of ulcerative colitis. Small amounts (100–120 ml.) of therapeutic solutions are being introduced into the rectum by the slow-drip method of Truelove (1956, 1957) and by the single-dose retention enema (Matts 1960a). In addition, small-volume evacuant enemata are being widely employed in nursing practice, using disposable plastic bags.

Although these techniques are widely used, many people are unaware of the degree of penetration of the solutions so introduced. It therefore seemed important to demonstrate the extent of retrograde spread of these solutions. A simple and fairly convincing way of doing this is by introducing a radio-opaque solution into the rectum.

Present Investigation

Objectives.—(1) To determine the extent of penetration of intrarectally introduced solutions, using the enema-bag method, in patients with ulcerative colitis (Matts, 1960a, 1960b). (2) To determine the extent of penetration of intrarectally introduced solutions, using the slow-drip method of Truelove (1956, 1957, 1958, 1959), in patients with ulcerative colitis. (3) To compare these two methods and consider the possible advantages of one or other method from the viewpoint of therapeutic application. (4) To determine the penetration of intrarectally introduced solutions, using the enema-bag method, in normal people. This was undertaken to see whether there was any difference in penetration in normal people as opposed to those with ulcerative colitis. It was also felt to be of value to know the retrograde penetration in normal people in view of the increasing prevalence of the use of these disposable plastic enema bags as evacuant enemata in district-nursing procedures, etc. (over 100,000 of these were sold in 1959 according to the figures of one manufacturer).

Method.—Patients who were to have barium-enema examinations either for ulcerative colitis or for other reasons formed the subjects of the investigation. They were brought to a special radiological clinic and initially were given either the enema bag or the slow-drip infusion. Screening and the taking of films were followed by a normal barium-enema examination. Thus up-to-date information was immediately available, for diagnostic or confirmatory purposes, of the type and extent of disease, if any.

Technique

A 40% suspension of barium in water was employed as a radio-opaque solution without any additive. The plastic enema bag was filled with 100 ml. of the barium suspension and inserted into the rectum in the same way

as the therapeutic solutions were given. The patient was on the left side and was rolled over on to the abdomen after the injection was finished, in exactly the same way as the patients using the therapeutic enemata were instructed to do. Screening was performed and films were then taken.

If the patients were to be tested with the drip technique the apparatus was first set up as illustrated by Truelove (1959). Then 100 ml. of barium was put into the infusion bottle and the intrarectal catheter inserted. The solution was then slowly run in as Truelove (1956, 1957, 1958, 1959) recommended. When it was all run in the patient was rolled on to the abdomen for two to three minutes so that conditions were exactly comparable to the enema-bag technique and screening was performed and films were taken.

Patients who were having a routine screening barium-enema examination to exclude other disease were used as the normal controls. They were counted in the series only if the subsequent barium-enema examination confirmed that their colons were radiologically normal. The enema-bag technique used was exactly the same as that previously described for the ulcerative-colitis patients.

In all, 10 patients were investigated in each group, making a total of 30. The ulcerative-colitis patients were unselected and the decision whether to use drip or enema bag was made by random selection.

Results in Ulcerative-colitis Patients

With Plastic-Bag Administration of Radio-opaque Solution.—In order to save space, films of only two patients are shown (Figs. 1 and 2). These are representative of the best and the worst penetration of the series. Figs. 1 and 2 and the Table clearly show that the solution introduced into the rectum by the single-dose enema-bag technique penetrates a long way up the colon. The least retrograde penetration found was nearly to the splenic flexure and the most was to the ascending colon. This clearly shows that much of the

Fig. 1.—Least penetration of colon with bag enema in ulcerative colitis.

colon comes within the field of operation of intra-rectally introduced solutions, and this fact is of importance in considering their therapeutic application.

With Slow-drip Infusion of Radio-opaque Solution.—Again two patients' films are illustrated (Figs. 3 and 4), and the full results are shown in the Table. These films show that a similar degree of penetration can be achieved by this method to that obtained with the enema bag. The only difference was that in two patients of the series the penetration was only as far as the rectum, so possibly the most adverse result, in terms of penetration, may be worse by this method than by the enema-bag method.

FIG. 2.—Most penetration of colon with bag enema in ulcerative colitis.

FIG. 3.—Least penetration of colon with slow-drip enema in ulcerative colitis.

Extent of Retrograde Penetration Into the Colon According to Method of Administration and Presence or Absence of Ulcerative Colitis

Retrograde Penetration as far as—	Ulcerative-colitis Patients		Patients Without Colonic Disease
	Single Dose from Enema Bag	Slow-Drip Infusion	Single Dose from Enema Bag
Caecum	0	0	0
Ascending colon .. .	2	2	0
Hepatic flexure .. .	2	0	0
Mid-transverse colon ..	3	2	0
Splenic flexure .. .	1	2	2
Mid-descending colon ..	2	1	4
Sigmoid .. .	0	1	4
Rectum only .. .	0	2	0
Total ..	10	10	10

Results in Patients Without Ulcerative Colitis and With Radiologically Normal Colons

Representative films from two patients are shown in Figs. 5 and 6, and the full results are given in the Table. A possible significant difference is here seen. The degree of penetration is not so great in these patients as in those with ulcerative colitis. Out of the 10 patients investigated only two have comparable films, from a viewpoint of penetration of the solution, to that seen in ulcerative-colitis patients. All the others show much less retrograde spread of the injected radio-opaque solution up the colon. A possible explanation for this is that the colon in ulcerative colitis lacks tone and thus offers less resistance to retrograde spread. Alternatively, the loss of haustrations (often absent radiologically in ulcerative colitis) may mean that downward peristaltic activity is less marked, and this is the cause of the lessened resistance to the upward flow of intra-rectally introduced solutions.

Of course, it is possible that this is a coincidental finding due to the small number of cases in the series. However, it seems striking enough to warrant some speculation into its cause and also, perhaps, to justify further investigation in the future.

FIG. 4.—Most penetration of colon with slow-drip enema in ulcerative colitis.

Discussion of Results

It is clear from the results of this radiological investigation that single-dose plastic-enema-bag administration of solution into the rectum gives good results, especially in ulcerative colitis. From a therapeutic point of view one can expect a minimum penetration of the solution up to the mid-descending colon. In many cases penetration retrogradely will occur as far as the splenic or hepatic flexures. This brings a good part of the colon into the range of solutions administered intrarectally. This is a very important finding and demonstrates the range of useful clinical application of intrarectal thera-

FIG. 5.—Least penetration of colon with bag enema in normal subject.

FIG. 6.—Most penetration of colon with bag enema in normal subject.

peutics. It must be remembered that one is using a suspension of barium in this investigation. This does not diffuse readily owing to its fairly high viscosity; thus it seems reasonable to suggest that an actual aqueous solution of prednisolone, with its lower viscosity, should diffuse further and thus give greater retrograde colonic penetration. This postulation is supported by results of the therapeutic solution's effectiveness in a few cases of generalized ulcerative colitis (Matts, 1961).

Comparison of drip and single-dose-enema techniques shows little advantage either way. This clearly refutes suggestions that the slow drip method is a necessary part of intrarectal therapeutic technique due to failure of penetration of a fairly rapid one-dose administration. If anything, the single-dose method shows more consistent retrograde penetration into the colon.

The coincidental finding of less penetration of the normal colon as opposed to that of sufferers from ulcerative colitis has already been discussed. It is important to realize how far back solutions inserted into the rectum are apt to get. This may influence formulation of the solutions used in the evacuant plastic-bag enemata that are being widely employed these days in district nursing and obstetric work. Some solutions that are harmless when only expected to be in the rectum may have adverse effects if they penetrate far into the colon.

Summary

A radiological investigation has been conducted into the degree of penetration of intrarectally introduced solutions into the colon.

This shows that penetration can sometimes be achieved as far as the ascending colon with only 100 ml. of radio-opaque suspension. In most sufferers from ulcerative colitis the left side of the colon can easily be reached.

No significant difference was shown between the slow drip and the single-dose plastic-enema-bag method of administration.

In people not suffering with ulcerative colitis the degree of retrograde spread was less. Reasons for this are briefly discussed.

Ulcerative colitis by its nature therefore seems to lend itself to intrarectal therapy.

The significance of the degree of penetration of intrarectal solutions is briefly discussed with respect to the plastic-bag evacuant enemata used in many nursing procedures.

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The Australian National Heart Campaign has raised £A2,250,000 for research—£4m. more than the national target. The appeal, which ended recently, was carried out by 200,000 collectors throughout Australia.