VALUE OF STRICT DIETING, DRUGS, AND "ROBADEN" IN PEPTIC ULCERATION

BY

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Recent papers on gastric and duodenal ulceration express conflicting views on the value of many of the therapeutic measures customarily used in the conservative (non-surgical) treatment of the two diseases. Nicol (1939), Ronald (1939), and Lawrence (1952) found that rest in hospital on a light diet or even a normal hospital diet gave results as good as those obtained in hospital on a strict "ulcer" diet with antacids and belladonna, whilst Doll and Pygott (1952) found that cases treated on a "gastric" diet in hospital fared better than those on ambulatory treatment with a "convalescent" diet. They were undecided whether the physical and mental rest or the supervised strict dieting was the important factor, although they showed that phenobarbitone and vitamin C had no influence on the rate of ulcer healing. Martin and Lewis (1949), as a result of a 10-14-year follow-up of cases, concluded that medical treatment had no influence on the natural history of gastric and duodenal ulceration. Morton Gill (1947) found that the treatment of gastric ulcers with subcutaneous injections of sterile water whilst the patients were ambulant and on a normal diet gave results as good as those achieved with orthodox treatment.

The great importance of anxiety and mental stress in the pathogenesis and in the precipitation of relapse of peptic ulceration, and particularly of duodenal ulceration, is now generally accepted (Davies and Wilson, 1937; Nicol, 1939, 1942; Gill, 1947).

Many authors have stressed the importance of controlling gastric acidity. Nicol (1939) and Douthwaite (1939, 1947) showed that full doses of belladonna and the usual antacids, given by mouth, have no great effect on the diurnal gastric acidity, and Douthwaite and Thorne (1951) showed that hexamethonium was equally ineffective by day. Nocturnal acid secretion is, however, largely governed by neural mechanisms, and night acid can be controlled by hexamethonium (Kay and Smith, 1950) and full doses of belladonna (Riddell, 1951). Diurnal acid secretion can be controlled effectively by a continuous milk drip (Winkelstein, 1932) and by the continuous sucking of milk-alkali tablets (Douthwaite and Batty Shaw, 1952).

Regarding the prognosis of peptic ulceration most authors are gloomy. Nicol (1942), in a four-year follow-up of 389 cases, found that only 17% remained symptom-free, although a further 41% were well enough to remain at work on a diet. Martin and Lewis (1949) in a 10-14 year follow-up found 44% of gastric ulcers and 33% of duodenal ulcers inactive (no ulcer dyspepsia for the preceding five years). Barsby (1951) followed up her gastric ulcer subjects with the gastroscope until complete healing had taken place, but found that 43% had a recurrence at the original site and a further 9% at other sites.

It is therefore not surprising that many clinicians are sceptical of the value of many of the traditional

drugs and regimes used in the treatment of peptic ulceration. Todd (1949, 1951, 1952) cast doubt on the value of rest in bed, absence from work, strict dieting, sedation, and the avoidance of alcohol and tobacco. He advocated the liberal use of antacid tablets.

The possibility that in peptic ulcer subjects a "mucosa protecting" substance might be lacking has excited the interest of clinicians for some years, and recently "robaden" has been claimed by many Continental authors to possess ulcer-healing and mucosa-protecting properties (Neumann, 1948; Barfred, 1950; Schmassmann, 1951; Burghartz, 1951; etc.). Robaden is described by the makers as protein-free extracts obtained from the stomach and small intestine of freshly slaughtered young animals. The water-soluble part of the extract is used by injection and the water-insoluble part is taken by mouth in tablet form. The British literature contains few references to robaden. Hubacher (1946) claimed very good results in a 16-months follow-up of 54 patients treated with robaden whilst ambulant on a normal diet. There was, however, no control series. Stolte (1950) gave, impartially, robaden or a placebo to 101 patients with gastric or duodenal ulceration whilst they carried on with their normal work and diet. He found that, from the clinical and radiological points of view, there was no difference in the percentage of success. A possible criticism of this work is, however, that the injections and tablets of robaden were not given concurrently, as recommended by the makers.

In 1948 I decided to investigate the value of robaden in treatment and also whether strict dieting together with the usual gastric drugs whilst the patient was on strict rest in bed in hospital had any advantages over treatment in hospital on a light diet and partial ambulation.

Material and Method

I had the use of a male gastric ward of 10 beds, into which I admitted proved or suspected ulcer cases from the out-patient department. Those considered to be in need of surgery when first seen were not included in the series. The final diagnosis of peptic ulceration was made on radiological evidence supported, in a few cases, by gastroscopy. On admission, if not already done in the out-patient department, a barium-meal x-ray examination and an alcohol-histamine fractional test meal were performed, and during the fourth week in hospital three consecutive stools were examined for occult blood and the barium-meal examination was repeated. Almost all the radiology in the series was done by one radiologist.

The series comprised 27 patients with gastric ulcer, of whom five were female and three also had a duodenal ulcer, and 87 patients with a duodenal ulcer, of whom two were female and three also had a gastric ulcer.

On the patients' admission their names were put on a rota which decided by which of four methods they were to be treated. The four methods were: (i) strict gastric diet plus drugs, on strict rest in bed (bathroom freedom allowed once a day); (ii) as above, with the addition of robaden; (iii) post-ulcer diet whilst allowed up and about two hours daily; and (iv) as in (iii), with the addition of robaden. (Details of the diets and drugs used are given in the Appendix.)

Patients on robaden were given each morning for 21 days 1 ml. of the appropriate injection (for gastric or duodenal ulcer as the case might be) intramuscularly into the lateral aspect of the thigh, together with one robaden tablet three times a day before meals for seven weeks and then one tablet daily for the first ten days in each month for three

months. Patients on robaden whose pain persisted for longer than a few days after admission had their daily injection increased to 2 ml. for a week. Cases *not* on robaden were given placebo injections and tablets on the same schedule as the robaden cases. After four weeks' in-patient treatment the patients were sent home on their allotted regime (see Appendix) for three weeks, following which they were seen by me personally. If all was well they were then advised to return to work while keeping to their treatment. They were asked to come and see me every three months, and were encouraged to come up earlier if they had a recurrence of symptoms.

The following study deals with those patients whom I followed up for at least six months. The final information about the patients was obtained by interview in half the number. The remainder, who did not respond to an invitation to attend, replied to a questionnaire (see Appendix).

It is thought that the patients in each therapeutic group are comparable, as can be seen from Table I.

TABLE I

Treatment Group	No. of Cases		Average Length (Years) of Ulcer Symptoms		Average Age (Years)	
	G.U.	D.U.	G.U.	D.U.	G.U.	D.U.
1. Robaden + strict diet ..	6	20	7	5½	49	39
2. Strict diet ..	10	28	5	6	46	40
3. Robaden + post-ulcer diet ..	7	19	5	8	46	43
4. Post-ulcer diet ..	4	20	5	9	46	46

The history of previous treatment and complications, and also the alcohol and tobacco habits, were comparable in each of the groups.

Results

A. Patients with Gastric Ulceration

Comparison of the results between the four therapeutic groups was made in a number of ways. The disappearance of pain and tenderness was not found to be helpful, as these almost always disappeared within a few days of admission, whilst the absence of occult blood during the fourth week in hospital (at least two specimens examined) and the return of the radiological picture to normal were not of much value in assessing the prognosis. Thus, of those followed up for at least six months, only five had negative occult blood tests, and two of these had a recurrence of ulceration after 30 and 32 months (average follow-up time in those with no recurrence, 29 months), while 20 patients returned to radiological normality, of whom 5 relapsed (average time to relapse, 14 months; average follow-up time, 28 months). It is, however, of interest that of the 20 patients who returned to normal, 9 were on post-ulcer diet and robaden or post-ulcer diet alone, and none relapsed (average follow-up time, 30 months).

The figures in Table II give no indication that robaden expedites healing.

TABLE II.—Details of Radiological Results

Treatment Group	No. Followed until Healed Radiologically	Average Healing Time	Average No. of Barium-meal X-ray Examinations
1. Strict diet + robaden ..	4	9 weeks	4
2. Strict diet alone ..	8	9 "	4
3. Post-ulcer diet + robaden ..	6	19 "	3.2
4. Post-ulcer diet alone ..	3	7 "	2.3

1. *Clinical relapse rate* amongst the cases followed up for at least six months, severe enough to need dieting while they were off work (Table III). Those who were referred for surgical treatment during their initial admission to hos-

pital, and also those who, because they did not respond to the allotted regime, were given stricter treatment, are excluded.

The figures in Table III can be treated in another way—dividing the cases into four further groups: (A) those treated on diet alone (strict diet alone and post-ulcer diet alone);

TABLE III

Treatment Group	No. of Cases Followed Up at Least 6 Months	No. of Cases which Relapsed	Average Length of Follow-up in those Not Relapsing	Average Time to Relapse	Relapse
1. Strict diet + robaden ..	5	3	20 months	7 months	60%
2. Strict diet alone ..	7	3	26 "	12 "	43%
3. Post-ulcer diet + robaden ..	5	0	34 "	—	0
4. Post-ulcer diet alone ..	4	1	25 "	23 months	25%

(B) those given robaden (strict diet + robaden and post-ulcer diet + robaden); (C) those treated with a strict ulcer diet (strict diet + robaden and strict diet alone); and (D) those given a post-ulcer diet (post-ulcer diet + robaden and post-ulcer diet alone) (Table IV).

TABLE IV

Group	No. of Cases Followed Up at Least 6 Months	No. of Cases which Relapsed	Average Length of Follow-up in those not Relapsing	Average Time to Relapse	Relapse
A. Diet ..	11	4	26 months	15 months	36%
B. Robaden ..	10	3	29 "	7 "	30%
C. Strict diet ..	12	6	23 "	9½ "	50%
D. Post-ulcer diet ..	9	1	31 "	23 "	11%

2. Two patients were given stricter treatment because they were not responding to their allotted regime. One was in group 2 and the other in group 3. Two cases came to surgery during their initial admission—one in group 1 and the other in group 3.

3. It is considered fair to compare each therapeutic group on the number of "failures" in each group. By failures is meant those who had a clinical relapse, those who came to surgery during their initial admission, and those who, because they were not responding to the allotted treatment, were put on to a stricter regime (Table V).

TABLE V

Treatment Group	Average Length of Follow-up	" Failures "	
		No.	%
1. Strict diet + robaden ..	20 months	4 out of 6	67
2. Strict diet alone ..	26 "	4 " " 8	50
3. Post-ulcer diet + robaden ..	34 "	2 " " 7	29
4. Post-ulcer diet alone ..	25 "	1 " " 4	25

Treating these figures in a different way gives the results shown in Table VI.

TABLE VI

Group	Average Length of Follow-up	" Failures "	
		No.	%
A. Diet ..	26 months	5 out of 12	42
B. Robaden ..	30 "	6 " " 13	46
C. Strict diet ..	24 "	8 " " 14	57
D. Post-ulcer diet ..	31 "	3 " " 11	27

The average gain in weight from the first to the last interview among those treated on a strict diet was 3 lb. (1.4 kg.) (average of 16 cases), whilst those treated on a post-ulcer diet gained 13 lb. (5.9 kg.) (average of 10 cases).

Comment.—These figures suggest that, of the regimes tested, a post-ulcer diet at rest in hospital gives the best results, and no evidence was found that robaden was of value in treatment. It is realized, however, that the series is a small one.

B. Patients with Duodenal Ulceration

1. Very strict radiological criteria were used before pronouncing a duodenal ulcer as having healed—namely, a cap normal in shape and with no demonstrable spasm or ulcer crater. Table VII gives details of the radiological results.

TABLE VII.—*Details of Radiological Results*

Treatment Group	No. who had Repeated Barium Meal X-ray Exams	No. Followed Until Healed Radiologically	Average Healing Time	Average No. of Barium Meal X-ray Exams
1. Strict diet+robaden	18	3	6 weeks	3.2
2. Strict diet alone	23	10	15 "	2.6
3. Post-ulcer diet+robaden	17	3	10 "	3.0
4. Post-ulcer diet alone	16	5	8 "	2.9

2. *Clinical Relapse Rate.*—Amongst the cases followed-up for at least six months, severe enough to need strict dieting while they were off work. Those who were referred for surgical treatment during their initial admission and also those who, because they did not respond to the allotted regime, were given stricter treatment are excluded.

TABLE VIII

Treatment Group	No. of Cases Followed Up at Least 6 Months	No. of Cases which Relapsed	Average Length of Follow Up in those Not Relapsing	Average Time to Relapse	Relapse
1. Strict diet+robaden	13	6	27 months	21 months	46%
2. Strict diet alone	17	4	27 "	9 "	24%
3. Post-ulcer diet+robaden	9	2	35 "	7 "	22%
4. Post-ulcer diet alone	15	7	25 "	16 "	47%

Treating these figures in a different way, by dividing the cases into the four groups: (A) "diet" (strict diet alone and post-ulcer diet alone), (B) "robaden" (strict diet+robaden and post-ulcer diet+robaden), (C) "strict diet" (strict diet+robaden and strict diet alone), and (D) "post-ulcer diet" (post-ulcer diet+robaden and post-ulcer diet alone), the results shown in Table IX are obtained.

TABLE IX

Group	No. of Cases Followed Up at Least 6 Months	No. of Cases which Relapsed	Average Length of Follow Up in those Not Relapsing	Average Time to Relapse	Relapse
A. Diet	32	11	26 months	13 months	34%
B. Robaden	22	8	31 "	17 "	36%
C. Strict diet	30	10	27 "	16 "	33%
D. Post-ulcer diet	24	9	29½ "	14 "	37½%

The figures in Tables VIII and IX do not demonstrate a clear-cut advantage of any of the four therapeutic regimes used.

3. Ten patients, because they were not responding to their allotted regime, were given stricter treatment (strict diet+continuous milk drip): one was in group 1, two were in group 2, five were in group 3, and two were in group 4.

In this series the prognosis in cases given continuous-milk-drip treatment was poor, but these patients, together with the nine described below, represented the hard core who did not respond at all to their allotted treatment.

4. Nine cases, owing to lack of response to treatment, came to surgery during their initial admission: three were in group 1, three in group 2, one in group 3, and two in group 4.

5. *Failures in Each Therapeutic Group.*—The figures comprise those who relapsed clinically, those who came to surgery during their initial admission, and those who, because they were not responding to the allotted treatment, were given a stricter regime. If in the last four groups in Table X the follow-up time is increased to 31 months the estimated failure rates (simple arithmetical proportions) are: diet, 58%; robaden, 56%; strict diet, 56%; and post-ulcer diet, 59%. As regards efficacy of treatment, these figures suggest that there is little to choose between the four therapeutic regimes.

TABLE X

Group	Average Length of Follow-up in Non-failures	Failures	
		No.	%
1. Strict diet+robaden	27 months	10 out of 17	59
2. Strict diet alone	27 "	9 " " 22	41
3. Post-ulcer diet+robaden	35 "	8 " " 15	53
4. Post-ulcer diet alone	25 "	11 " " 19	58
A. Diet	26 "	20 " " 41	49
B. Robaden	31 "	18 " " 32	56
C. Strict diet	27 "	19 " " 39	49
D. Post-ulcer diet	29 "	19 " " 34	56

6. The absence of occult blood in the stool during the fourth week in hospital was not found to be of great prognostic importance, but the return of the duodenal cap to normal carried a good prognosis. With a follow-up of at least six months a total of 18 of the duodenal ulcer cases returned to a normal cap on radioscopy at some period (average follow-up time, 29 months), and only three of these had a clinical relapse after an average of 25 months' freedom, although there were four radiological relapses (symptomless) after an average of 14½ months.

7. The average gain in weight from the initial interview to the last one among those patients treated on a strict diet was 3.9 lb. (1.8 kg.), whilst the post-ulcer diet group gained 4.9 lb. (2.2 kg.).

Conclusions

These results support the findings of Nicol (1939), Ronald (1939), and Lawrence (1952) that rest in hospital on a light diet gives results as good as those achieved by rest in hospital on a strict "ulcer" diet with belladonna and antacids. As Doll and Pygott (1952) have found that cases treated on a "gastric" diet in hospital did better than those on ambulatory treatment and a "convalescent" diet, the conclusion can be drawn that the important factors in any successful therapeutic regime are mental and/or physical relaxation, together with the natural tendency for clinical remissions to occur in peptic ulceration.

In this country, at present, most people can best obtain this beneficial relaxation in a hospital ward where suitable food is provided, there is freedom from domestic tension, and financial worries are in most cases absent, owing to the National Insurance. It is felt that small gastric wards are an advantage: the patient has a feeling of individuality, whilst at the same time a community spirit is fostered. An occasional patient, of course, never settles down to ward life, and in these instances it is doubtful whether it is worth persevering with in-patient medical treatment.

My present routine is to treat patients with peptic ulceration in hospital on a "post-ulcer" diet. They spend most of their time in bed, but are allowed bathroom freedom and are up and about for two to three hours daily. Each patient has a supply of magnesium trisilicate on his locker, and he is encouraged to help himself to a dose whenever he has pain or discomfort. He spends a month in the ward, after which he continues resting at home on the same diet for a further

three weeks. He is then seen again and almost always advised to restart his work.

The occasional patient who fails to respond to this regime will need stricter treatment, such as a continuous milk drip or the continuous sucking of milk-alkali tablets, but my experience is that most of these refractory cases will need surgery within a few months.

Regarding after-care, it is suggested that the patient continues with his post-ulcer diet while back at work, avoiding excessive smoking and alcoholic indulgence. He should be encouraged to cultivate a calm and philosophical attitude to the stresses and strain of life, and he should, when he has discomfort, take freely of one or other of the harmless antacids as suggested by Todd (1952). In view of the high relapse rate in peptic ulceration, whatever medical treatment one gives, resort to surgery should not be delayed unduly. My practice is to advise surgery (provided there are no contraindications) if the patient relapses after one or at most two courses of medical treatment.

If this simple treatment of peptic ulceration gains favour much labour will be saved in preparing complicated diets and there will be saving on the cost of drugs. A good library, wireless, facilities for card games, and television will help to pass the time. Conventional occupational therapy is, I find, not popular with peptic ulcer patients.

Regarding robaden, I could find no clear evidence of its value. However, the patients treated with robaden were given it for only five months, and it is possible that if it had been given for a longer period beneficial effects might have been seen.

Summary

A total of 111 patients with peptic ulceration were treated in hospital and divided impartially into four therapeutic groups: (1) strict ulcer diet + robaden; (2) strict ulcer diet alone; (3) post-ulcer diet + robaden; and (4) post-ulcer diet alone. As a result of a follow-up study it is concluded that treatment on a post-ulcer diet gives results as good as those obtained with the other three regimes, and it is suggested that the important factors in any successful therapeutic regime for peptic ulceration are mental and/or physical relaxation, which assist the natural tendency for remissions to occur.

My thanks go to Dr. Stanley Nowell for the radiology; to Dr. John Forbes, who originally worked out the diets, for advice; to Professor Scarborough for advice; to the house-physicians who have kept such scrupulous notes; and to Sister J. Roberts, who instilled the right spirit into the ward and saw that the patients kept to their allotted regime.

REFERENCES

- Barfred, A. (1950). *Nord. Med.*, 43, 748.
 Barsby, B. (1951). *Lancet*, 2, 59.
 Burghartz, N. (1951). *Arzt. Wschr.*, 6, 509.
 Davies, D. T., and Wilson, A. T. M. (1937). *Lancet*, 2, 1353.
 Doll, R., and Pygott, F. (1952). *Ibid.*, 1, 171.
 Douthwaite, A. H. (1939). *Practitioner*, 143, 461.
 — (1947). *British Medical Journal*, 2, 43.
 — and Shaw, A. B. (1952). *Ibid.*, 2, 180.
 — and Thorne, M. G. (1951). *Ibid.*, 1, 111.
 Gill, A. M. (1947). *Lancet*, 1, 291.
 Hubacher, O. (1946). *Ibid.*, 2, 272.
 Kay, A. W., and Smith, A. N. (1950). *British Medical Journal*, 1, 460; 2, 807.
 Lawrence, J. S. (1952). *Lancet*, 1, 482.
 Martin, L., and Lewis, N. (1949). *Ibid.*, 2, 1115.
 Neumann, H. (1948). *Schweiz. med. Wschr.*, 78, 1085.
 Nicol, B. M. (1939). *Lancet*, 2, 881.
 — (1942). *Ibid.*, 1, 466.
 Riddell, M. J. (1951). *British Medical Journal*, 2, 1498.
 Ronald, J. (1939). *Ibid.*, 2, 1033.
 Schmassmann, H. (1951). *Schweiz. med. Wschr.*, 81, 166.
 Stolte, J. B. (1950). *Lancet*, 2, 858.
 Todd, J. W. (1949). *Rational Medicine*. Bristol.
 — (1951). *Lancet*, 2, 438.
 — (1952). *Ibid.*, 1, 113.
 Winkelstein, A. (1932). *Amer. J. Surg.*, 15, 523.

APPENDIX

Regime followed by those patients treated on "strict diet."

Regime A: Strict Rest in Bed (Bathroom Freedom Once Daily)

On waking.—A glass of milk to be sipped slowly.

8 a.m.—A lightly boiled, poached, or scrambled egg. Four thin half-slices of toast or bread-and-butter. A cup of milk flavoured with tea and sugar.

10 a.m.—A glass of milk to be sipped slowly. Two digestive biscuits or rusks.

12 noon.—A small portion of boiled or roast chicken; or of steamed, boiled, or grilled white fish; or of tender steak or chop; or of tripe, calf's heart, or liver. Two heaped tablespoonfuls of mashed creamed potato. A glass of milk.

2 p.m.—A glass of milk to be sipped slowly. Two digestive biscuits or rusks.

4 p.m.—A cup of milk flavoured with tea and sugar. Four half-slices of thin bread-and-butter. A portion of plain sponge cake.

6 p.m.—A moderate amount of rice, macaroni, cornflour, arrowroot, or some other milk pudding. A glass of milk.

8 p.m.—A glass of milk to be sipped slowly.

10 p.m. (if awake).—A glass of milk to be sipped slowly.

During the night the patient should be given a drink of milk or cocoa if he wakes up.

No condiments are allowed. All food must be chewed carefully and the month rinsed afterwards and kept clean.

Drugs (No other drugs are to be given without the doctor's orders).—(1) Phenobarbitone, 1 gr. (65 mg.) b.d. (2) Laevohyoscyamine, 1/120 gr. (0.54 mg.) b.d. (3) Olive oil, 1 dr. (3.5 ml.) t.i.d., after the 8 a.m., noon, and 6 p.m. feeds. (4) Soluble amylobarbitone (sodium amytal) 3 gr. (0.2 g.) nocte p.r.n. (if patient awake). (5) Liquid paraffin or an enema may be given for constipation. (6) A teaspoonful of magnesium trisilicate two-hourly, half an hour after each feed, and two teaspoonfuls last thing at night.

After three weeks the patients went on to the following diet:

Regime B: Bathroom Freedom and Up and About Two Hours Daily

Breakfast.—Small portion of porridge with milk or cream and sugar if desired. Bread or toast with butter and marmalade. A lightly boiled, poached, or scrambled egg. A cup of weak tea with milk and sugar.

10.30 to 11 a.m.—A glass of milk with biscuits or rusks.

Dinner.—4 oz. (113 g.) of fish, chicken, game, beef, chop, steak, mutton, or lamb. Boiled, baked, or mashed creamed potato. A small milk pudding. Milk or water to drink.

Tea.—A cup of weak tea with milk and sugar. Bread-and-butter. Jelly or plain cake.

Supper.—Cold meat or tongue, boiled or grilled fish. Bread-and-butter. Purée of prunes, apples, or other fruit, flavoured with milk and sugar. Milk or water to drink.

8 to 9 p.m.—A glass of milk.

Drugs.—As in Regime A.

The patient should eat slowly, chewing all food carefully.

After a week on this regime, sieved vegetables should be added to the midday meal, and, after a further week, ordinary cooked vegetables allowed.

Similarly, after the first week, the fruit at the evening meal need not be sieved, but the patient should avoid all skins and pips.

After a further week the patients went home with a copy of this regime, which they were asked to follow until seen at the out-patient department three weeks later, when they were given a copy of the following "post-ulcer diet," which they were advised to keep to whilst working. This diet is also the one followed from the start by the groups treated on "post-ulcer diet" (one month in hospital and then three weeks at home, spending most of the time resting in bed but from the beginning allowed bathroom freedom and to be up and about two hours a day).

Regime C: Ordinary Food Should be Taken with Certain Reservations

1. *No roughage.* Avoid all pips and skins of fruit, unripe fruit, nuts, currants, raisins, figs, raw vegetables, fibrous vegetables (celery, etc.), and gristly meat.

2. *No irritants.* Avoid such things as hot gravies, spices, vinegar, lemon juice, pepper, mustard, curry, pickles, chutney, and strong hot tea or coffee. Take salt in strict moderation. Take alcohol in strict moderation only. Avoid all drugs and patent medicine, especially aspirins and strong purgatives (see below). Smoking should be indulged in only after meals and in strict moderation (five cigarettes, or three small pipefuls daily).

3. *Overeating at one meal is as bad as going for long periods without food.* Both are harmful, and it is important to supplement the three principal meals by taking a milk drink with chocolate biscuits or bread in the middle of the morning and in the afternoon and last thing at night. All food must be carefully chewed before swallowing.

4. *It is a mistake to avoid certain foods* (with the exceptions mentioned above) on principle because they are supposed to be indigestible. Narrowing the diet down too much leads to a loss of weight and malnutrition, which will tend to cause a recurrence of the indigestion. Eat any food that is available, unless it is found that a certain food always disagrees, in which case it should be avoided.

5. *If constipated* take a teaspoonful of milk of magnesia at night or a dessertspoonful of liquid paraffin morning and evening.

6. *Try to avoid mental and physical overstrain.* Keep regular hours, regular habits, and, above all, regular mealtimes. During unavoidable periods of extra work, intensive activity, or excitement, or when worried or upset, take extra care with diet: avoid beef, pork, pastry, and greasy foods.

7. *If indigestion is felt* take a dose of alkaline powder (magnesium trisilicate if possible), but do not take powder as a routine. Otherwise avoid all medicines, unless ordered by your doctor. If the indigestion is severe and does not clear up in a few days go and see your doctor.

8. Do not spend all your time worrying about your stomach and about your diet and about your health generally. Stick to these instructions, but otherwise forget about your stomach and enjoy life.

The following is a copy of the questionnaire sent to each of the patients who failed to keep his final follow-up appointment:

"I am very interested to hear how your indigestion has been since I last saw you, as we are doing some investigations on the subject.

"I should be most grateful if you would write to me in confidence (envelope enclosed) telling me in detail about any symptoms you have noticed, and also whether you have had any further treatment or operations, the date and results of any further barium-meal x-ray films of your stomach, and any complications that have occurred.

"Are you keeping to a diet, are you working, and how much tobacco are you smoking?"

During the last quarter of 1953 the City Analyst of Birmingham carried out a survey of five popular brands of "pocket inhaler." These articles consist of a conical plastic outer case with a smaller inner chamber containing absorbent paper soaked in amphetamine, or a closely related compound, together with menthol and essential oils. Sixty-four inhalers were examined, an average of 13 of each of the five brands. The first of these brands to be put on the market showed a remarkably consistent amphetamine content. Three other brands were very similar, but their content of amphetamine was less constant, sometimes showing an excess of up to 30%, and sometimes a deficiency of as much as 22%. The last brand examined, however, presented a very different picture: of 13 samples examined every one was deficient in amphetamine by amounts varying from 31% to 90%, with an average shortage of nearly 60%. The City Analyst then wrote to the makers, who suggested that the loss was due to evaporation consequent on long storage. However, no particular relationship could be discovered between age and the strength of the samples. As a result of this investigation the firm in question agreed to recall all inhalers issued before last year. In Mr. Bagnall's view, this appears to be yet another case where certain pharmacists have retained stocks of a preparation long after the time when they should have been destroyed or returned to the suppliers.

A PLEA FOR THE LONGER TREATMENT OF CHRONIC PYELONEPHRITIS IN CHILDREN

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Acute pyelonephritis in children responds to sulphonamides so well that its treatment rarely presents a problem. Sixteen cases in infants and children were treated in the Radcliffe Infirmary during 1948 and 1949; all cleared up rapidly and only one relapsed. The latter responded to a second course of sulphonamide, and there was no recurrence.

In chronic pyelonephritis the results are very different. In the same two-year period there were 16 chronic cases at the Radcliffe. Symptoms had been present for at least two weeks, and in most cases for very much longer when treatment was started. They were all given a sulphonamide in full dosage for five to fourteen days. In every case the infection relapsed. In four of these cases further investigation showed lesions requiring surgery, but the other 12 remained essentially medical problems. Our experience since then suggests that these results are in no way exceptional, and it is with the treatment of chronic pyelonephritis without surgically treatable lesions that this paper is concerned. In most cases the infection is due to a coliform organism sensitive initially to all the readily available antibiotics except penicillin. The question to be decided is which antibiotic should be used, in what dose, and for how long.

General Considerations

In 1939 Weiss and Parker reviewed the post-mortem findings in 100 cases of chronic renal tract infection. In only one was inflammation confined to the renal pelvis and ureters; in 99 inflammation involved the renal parenchyma, and the disease was rightly called pyelonephritis. Birchall and Alexander (1950), in a review of the medical aspects of pyelonephritis, accepted this view of its pathology. They pointed out that in treatment it is the concentration of antibiotic in the plasma which is significant, and not the concentration in the urine. Therefore only full doses of a sulphonamide or antibiotic should be given in the initial treatment of pyelonephritis. Furthermore, there is no particular merit in a sulphonamide such as "urolucosil," which has been recommended because of the high concentration of the non-acetylated form obtained in the urine. Birchall and Alexander also draw attention to the fairly general experience that, with streptomycin, organisms become resistant very rapidly. They suggested, for this reason, that streptomycin should never be given for more than five to seven days. They also pointed out that as mandelic acid and related compounds are effective only in an acid medium, which cannot be attained in the interstitial tissues of the kidney, these drugs are unlikely to be of value in pyelonephritis, and should be reserved for infections of the lower renal tract. For the treatment of chronic pyelonephritis they recommended a 21-days course of a sulphonamide in