

discipline will induce the patient to take the necessary precautions to prevent another abortion from occurring. (3) That each of the "successfully" treated pregnancies proceeded beyond the 28th week by chance.

The second possibility seems to us unlikely. The last suggestion has been fully considered above. As to the first possibility, our results would indicate that progesterone is the essential hormonal factor for maintaining pregnancy, and that adequate progesterone therapy should not be discounted as a method of preventing the recurrent factor in abortion sequences. The results certainly do not conform with Hamblen's (1939) warning that exogenous progesterone may hinder the intrinsic metabolism of progesterone, nor do they support the contention (Hoffman, 1944) that progesterone therapy should be employed only in cases in which the pregnanediol level has been shown to be subnormal.

### Summary

A series of 45 cases of habitual abortion treated prophylactically with progesterone pellet implantation (six 25-mg. pellets) yielded successful results in 86% of the patients with a history of two previous abortions, 89% with three previous abortions, and 75% with four or more previous abortions.

The series was subdivided into "primary" habitual abortion (in which all previous pregnancies had resulted in abortion) and "secondary" habitual abortion (in which one or more previous pregnancies, but not those immediately preceding the treated pregnancy, had proceeded beyond the 28th week). In these groups the results for primary habitual abortion were: 90% success with two previous abortions, 88% success with three previous abortions, and 60% success with four or more previous abortions; and for secondary habitual abortion, 75% success for two consecutive abortions immediately preceding the treated pregnancy and uniform success for the four cases of three or more abortions.

If the true incidence of "recurring" abortion is not much less than 0.1% these results indicate that the treatment was of value.

*Statistical Methods Used.*—The probabilities of obtaining the observed number of successes and failures in each group have been calculated direct from the binomial theorem, using the three different sets of estimates of the expected success rates. The combined probabilities for each set of three groups have been calculated from the formula:  $\chi^2 = -2 \sum \log_e p$ .

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## HAEMATEMESIS AND MELAENA

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Widely differing opinions have been expressed concerning the risk to life which accompanies bleeding from non-malignant ulceration of the stomach or duodenum (Chiesman, 1932; Cullinan and Price, 1932; Burger and Hartfall, 1934; G. Gordon-Taylor, 1937; Hurst and Ryle, 1937; Andresen, 1939; Meulengracht, 1939).

Some of the fallacies which abound in the published statistics relating to this condition have been critically discussed by Smith (1945) and also by Avery Jones (1947), who treated a large series of cases in a special gastro-enterological unit, with a mortality of 7.8%. He considered that the mortality has declined to between 5 and 10% during the past decade, but Baker (1947), reporting a series of 576 cases treated in a general hospital, found a mortality of 13.4%, and a recently published series by Lewin and Truelove (1949) showed a mortality of 19.5%. These figures are more likely to be representative of the results obtained in most hospitals, and they show that the management of gastro-duodenal haemorrhage is still far from satisfactory, many patients dying and many more causing grave anxiety and uncertainty regarding the best course to be adopted in their treatment.

More precise knowledge of the features which are of value in assessing the prognosis of the individual patient under the usual routine treatment would be very useful in distinguishing at an early stage which patients are in grave danger of dying from the haemorrhage. Until this particularly serious group of patients can be distinguished it will often be difficult to know whether one can reasonably persist with the routine conservative regime, or whether some other form of treatment should be considered. Much useful information regarding prognostic indications may be obtained from a study of the many papers published on the subject, in particular, Cullinan and Price (1932), Rafsky and Weingarten (1942), Heuer (1946), Baker (1947), Avery Jones (1947), and Lewin and Truelove (1949). But we believe it to be useful to see what further information may be obtained from an analysis of a large series of patients treated recently in the North-east of Scotland, more especially since some characteristics of peptic ulceration—for example, G.U./D.U. ratio—vary with the geographical area (Jamieson, Smith, and Scott, 1949), and it is possible that some features of gastro-duodenal bleeding might vary in the same way.

### Present Series

This is a consecutive series of 476 cases of haematemesis and/or melaena admitted as emergencies because of bleeding to the three general medical units of the Aberdeen Royal Infirmary from January, 1941, to December, 1948, inclusive. The series is presumed to include only patients bleeding from peptic ulcers or erosions, because the notes of all cases of haematemesis and melaena from all causes were reviewed, but all those where some other cause was found—for example, gastric carcinoma, portal hypertension with oesophageal varices, blood dyscrasia—

The British Standards Institution has published a British Standard on "Industrial Safety-Gloves." The material, size, and dimensions of many types of safety-gloves are specified, and appendices list the information to be given when ordering the gloves. The specification is obtainable from the institution at 24-28, Victoria Street, London, S.W.1 (4s., post free).

were excluded. Cases in which the notes gave no good evidence of recent appreciable blood loss were also excluded. The patients came from the city and surrounding country, none being refused on account of age or complications.

The mortality rates did not differ significantly in the three medical units despite some differences in the details of the conservative treatment employed.

**Occupation.**—The patients were drawn from the middle and lower classes. A study of the list of occupations of the patients failed to reveal any sort of predominance of class level or type of occupation within the series. Schanke (1946), in Northern Norway, found a high proportion of gastric ulcers among fishermen; in our series there were only seven fishermen, although there is a large fishing population in the region, and in only one of these was a gastric ulcer demonstrated, though another died and the site of the ulcer is unknown.

**Case Records.**—Detailed information about each case was obtained from a combination of the medical notes and the nursing charts, both being very full. The case notes of each of these patients have been extracted by one or other of us personally; as observed by Baker (1947) this personal scrutiny is absolutely necessary if the information obtained is to be reliable.

**Diagnosis**

A history of an ulcer shown by a previous barium meal examination or of an operation for perforation, stenosis, or ulcer pain was obtained in 127 patients (105 men, 22 women), and 157 had suffered a previous haematemesis or melaena. In 384 of the 410 surviving cases barium meal examination was carried out very soon after the test for occult blood in the stool became negative, but in the other 26 survivors it was omitted for various reasons. The results are shown in Table I.

TABLE I.—Results of Barium Meal Examination

Gastric ulcer .. .. .	33
Duodenal ulcer .. .. .	209
Gastric and duodenal ulcer .. .. .	4
Jejunal or stomal ulcer .. .. .	5
No ulcer seen .. .. .	133
Total barium meals .. .. .	384

Gastroscopy was never carried out during the bleeding, and in very few cases was it done at a later date. An ulcer was found at operation in 15 cases, and in every one of the 32 that came to necropsy. The situation of the bleeding-point is shown in Table II. Duodenal ulcer

TABLE II.—Situation of Bleeding-point

Site of Ulcer	Cases	Deaths
Gastric ulcer .. .. .	46	11
Duodenal ulcer .. .. .	240	30
Gastric and duodenal ulcer .. .. .	5	1
Jejunal or stomal ulcer .. .. .	7	2
Unknown site .. .. .	178	22
All cases .. .. .	476	66

was much commoner than gastric ulcer, which contrasts with the findings in series reported from London (Hurst and Ryle, 1937; Avery Jones, 1947; Tanner, 1949b), but agrees with the increased proportion of duodenal ulcers in Scotland found by Jamieson, Smith, and Scott (1949).

**Mortality**

Of the 476 patients 66 died (13.9%). This figure includes not only deaths due solely to exsanguination but also: (1) Those in which associated grave complications played

a major part, since these complications would probably either not have occurred or else would not have proved fatal in the absence of bleeding (Table III). (2) Those due

TABLE III.—Deaths Due to Bleeding Associated with Complications (16 Cases)

Perforated duodenal ulcer following soon after the haemorrhage .. .. .	4
Pulmonary embolism .. .. .	3
Severe pyloric stenosis necessitating emergency operation .. .. .	2
Cerebral thrombosis .. .. .	2
Pneumonia .. .. .	2
Congestive heart failure .. .. .	2
Coronary thrombosis .. .. .	1

to a haemorrhage in patients enfeebled by pre-existing disease (Table IV). We consider it unrealistic to exclude any of these deaths.

TABLE IV.—Deaths from Bleeding Associated with Pre-existing Disease (5 Cases)

Tuberculous right kidney and nephrotic left kidney .. .. .	1
Coronary thrombosis .. .. .	1
Paraplegia and general debility .. .. .	1
Severe mental depression .. .. .	1
Idiopathic steatorrhoea .. .. .	1

For reasons to be considered later the series is divided into two groups—those in whom the bleeding recurred after medical treatment had been started following admission to hospital (recurrent), and those who did not suffer such a recurrence (non-recurrent). In only 11 of the 51 fatal cases of the smaller (124) recurrent group was there a major complication in addition to the bleeding to account for death, but in the larger (352) non-recurrent group no fewer than 10 out of the 15 deaths were due to or hastened by major complications.

**Acute and Chronic Ulcers**

It was not easy to decide which patients were bleeding from a chronic and which from an acute ulcer, but a rough estimate of the number suffering from chronic ulcer may be arrived at by adding together the following groups.

Barium meal showed ulcer crater present after bleeding had ceased .. .. .	251
Chronic ulcer found at operation .. .. .	13
Chronic ulcer found at necropsy .. .. .	29
Some of the 44 patients in whom no direct evidence of the type of ulcer present was obtained—that is, 22 survivors who escaped having barium meal and 22 fatal cases subjected to neither operation nor necropsy. If we take note of the findings in groups 1 and 3 above we can estimate, by simple proportion, that 15 of the 22 survivors and 20 of the 22 fatal cases were suffering from chronic ulcer .. .. .	35
Total chronic ulcers .. .. .	328
Total acute ulcers (total cases minus chronic ulcers) .. .. .	148

On the basis of this calculation 61 (18.5%) of the 328 patients suffering from chronic ulcer died, as opposed to 5 (3.4%) of the remaining 148 patients assumed to be suffering from acute ulcer. These figures are only estimates, but they agree with the findings of other observers (Avery Jones, 1947; Baker, 1947).

**Length of Previous History**

A previous history of indigestion, epigastric pain, melaena, and other symptoms suggestive of peptic ulcer of more than one year's duration was obtained in 379 cases (79.6%). In the other 97 cases (20.4%) such previous history was either absent or of less than one year's duration.

It is of interest to determine whether the length of history bears any significant relation to the mortality rate or to the type of ulcer present. Table V shows that there was no significant difference between the mortality rates for the two groups.

TABLE V.—Effect of Length of Previous History

	Cases	Died
History less than one year .. .. .	97	11 (11.3%)
History more than one year .. .. .	379	55 (14.5%)
Total .. .. .	476	66 (13.9%)

The type of ulcer present is to some extent related to the length of history. Only 11.7% of patients with proved ulcers gave a history of less than one year, but this was obtained in 34.6% of those in whom barium meal failed to show an ulcer.

A dyspeptic history of one year's duration rather than a longer time—for example, five years—was taken as the best dividing-line for distinguishing between the "proved ulcer" and "unproved ulcer" groups at the onset of the bleeding, because it was found that although the number of negative barium meal cases having a history of less than one year—namely, 46 (34.6%)—increased to 66 (49.5%) with a history less than five years, yet the number of "proved ulcer" cases rose proportionately more—from 35 (11.7%) to 91 (30%)—so that the longer history was even less useful in deciding which patients would have a demonstrable ulcer. But the length of history gave little help in the individual case.

**Age and Sex Incidence**

A considerable proportion (53%) of the patients were aged 50 years or over, and it was in this age group that most of the deaths occurred (Table VI). Many authors take

TABLE VI.—Age and Sex Incidence

Age Group	Male		Female		Both Sexes	
	Cases	Died	Cases	Died	Cases	Died
<30 ..	32	1	6	0	38	1
30-39 ..	48	1	13	1	61	2
40-44 ..	43	4	15	2	58	5
45-49 ..	48	2	18	2	66	4
50-59 ..	78	17	36	5	114	22
60-69 ..	43	8	40	7	83	15
70-79 ..	33	10	16	4	49	14
80+ ..	3	2	4	1	7	3
All ages ..	328	45 (13.8%)	148	21 (14.2%)	476	66 (13.9%)
<50 ..	171	8 (4.6%)	52	4 (7.7%)	223	12 (5.4%)
50+ ..	157	37 (23.5%)	96	17 (17.7%)	253	54 (21.3%)

50 years as the point where the mortality rate rises rapidly, though Thorstad (1942) suggested 45 years, and Avery Jones (1947) found that 60 was a more critical age. The fifth decade of the present series was divided into ages 40-44 and 45-49 to see if any sharp rise of mortality occurred before 50, but this again shows 50 to be the critical point; furthermore, the mortality for the 60-69 age group is no worse than for the 50-59 group, but the figure rises sharply after that. The sex incidence of 69% male and 31% female is in agreement with most reported series; the mortality was roughly equal in the two sexes, and this was true through all the age groups.

**Effects of Previous Haemorrhage**

There is a difference of opinion whether the prognosis is worse if the patient has suffered one or more previous haemorrhages. This was not so in the present series (Table VII)—a finding in agreement with that of Lewin and Truelove (1949). Of the 26 patients who had had a gastro-enterostomy performed at some earlier date, no fewer than 20 had had at least one haemorrhage subsequent to the operation and previous to the haemorrhage neces-

TABLE VII.—Effects of Previous Haemorrhage

	D.U.	G.U.	D.U. and G.U.	Jejunal or Stomal	No Ulcer Demonstrated	Total	Deaths
Had bled previously	92	12	1	7	45	157	21 (13.4%)
Had not bled previously ..	148	34	4	0	133	319	45 (14.1%)
Total ..	240	46	5	7	178	476	66 (13.9%)

sitating the present admission—a much higher proportion than in any other group. In seven of these a stomal or jejunal ulcer was later demonstrated, and all of these patients had bled previously.

**Severity of the Haemorrhage**

The amount of bleeding seen by the patient or attendants gave little help in assessing the actual blood loss. The pulse rate, the haemoglobin level, and the blood pressure have generally been used in attempts to express the patient's condition and progress in an objective manner, and a study of the hourly and half-hourly pulse charts confirmed the general view that a rising or maintained fast pulse rate usually indicated further bleeding, but it showed equally clearly that to wait till the pulse reaches 120 a minute (Baker, 1947; Cecil, 1947), or even 140 a minute (Dunlop, Davidson, and McNee, 1949) before deciding that the patient is ill enough to need transfusion is to wait too long in many cases (Table VIII).

TABLE VIII.—Maximum Pulse Rate Attained in 66 Fatal Cases

2 (3%) failed to reach 100 beats a minute at any time before death
30 (45%) " " 120 " " " " " "
53 (79%) " " 140 " " " " " "
13 (21%) reached 140 beats a minute before death

The well-recognized fall in blood pressure occurred in many cases, but the blood pressure was often well maintained even in the presence of serious haemorrhage, and in a few cases there was a deceptive temporary rise. As observed by Avery Jones (1939), blood transfusion raised lowered blood pressures (as was intended), but not to above normal levels.

It seems that delay in haemodilution following haemorrhage detracts greatly from the value of simple haemoglobin estimation, since in the two days after admission a further fall of 10-20% often occurred unaccompanied by other evidence of bleeding. The lowest haemoglobin level reached perhaps provides some measure of the severity of the bleeding in the group as a whole: in 243 (51%) of the patients it fell to 50% (Haldane) or lower; in 87 (18.3%) it fell to 30% or lower.

**Recurrent Bleeding**

If the age factor was excluded little guidance regarding the ultimate outcome could be obtained at the time of admission, however carefully the patient's history and condition were assessed. But the next few days after admission supplied a more definite guide. Brisk recurrent haemorrhage after admission to hospital has been generally recognized as being of serious prognostic significance. Of the 476 patients, 124 (26%) suffered a recurrence and 51 (41%) of these died; 352 (74%) did not bleed again, and only 15 (4.25%) of this group died. Table IX gives details of the combined effects of age and recurrence of bleeding, and Table X shows that sex had little influence on the mortality in either group.

The difference between mortality in the male and that in the female recurrent group is not statistically significant.

TABLE IX.—*Effect of Age and Recurrence of Bleeding*

Age Group	Non-recurrent		Recurrent	
	No. of Cases	Died	No. of Cases	Died
< 30 .. ..	29	0	9	1
30-39 .. ..	47	0	14	2
40-44 .. ..	45	1	13	4
45-49 .. ..	50	1	16	3
50-59 .. ..	77	3	37	19
60-69 .. ..	61	3	22	12
70-79 .. ..	37	5	12	9
80+ .. ..	6	2	1	1
All ages ..	352	15 (4.25%)	124	51 (41.1%)
< 50 .. ..	171	2 (1.2%)	52	10 (19.2%)
50+ .. ..	181	13 (7.1%)	72	41 (57%)
50-69 .. ..	138	6 (4.5%)	59	31 (51.5%)

Table IX shows that it is the sudden worsening in the prognosis at the age of 50 years in the recurrent group which influences the mortality figures for the whole series, because the non-recurrent group does not experience a sharp rise in mortality until 20 years later. It seems to us that the high mortality in these two decades—which

TABLE X.—*Effect of Sex and Recurrence*

Sex	Non-recurrent		Recurrent	
	No. of Cases	Died	No. of Cases	Died
Male .. ..	237	10 (4.2%)	95	35 (38.5%)
Female .. ..	115	5 (4.3%)	33	16 (48.5%)
Both sexes ..	352	15 (4.25%)	124	51 (41.1%)

are of great domestic and economic importance—shows that a critical review of the usual methods of treatment is necessary, for this age group at least. Patients over 70 showed a still higher mortality, but this is not so disquieting as in younger age groups. The mortality under the age of 50 has sometimes been considered to be negligible, but this was certainly not true here if bleeding recurred; the youngest death was in a man aged 22 who died after many recurrences.

The mortality at all ages rises abruptly as soon as there is a recurrence of the bleeding (Table IX). Other authors have considered that the risk of dying is greater if there is more than one recurrence of bleeding (Cullinan and Price, 1932; Baker, 1947; Avery Jones, 1947); our figures show the same trend, but the number of such cases in any one series is small.

The risk is not to be estimated by a comparison of the mortality rates in the "single recurrence" and the "multiple recurrence" groups, because it is not known at the time of the first recurrence whether any given patient is going to suffer a further recurrence; what is known is that he now belongs to the "total recurrent" group, and so it is by a comparison of the mortality in this group with the mortality in the "multiple recurrence" group that the physician can decide whether he will obtain a more definite indication of the danger to his patient's life if there is a further recurrence. Table XI shows that the further rise in mortality in the "multiple recurrence" group is relatively small (it is not statistically "significant" even in the collected total of cases) compared with the very large increase in risk which the first recurrence indicated.

Although it has long been recognized that recurrent bleeding is of grave prognostic significance, it is probably not generally realized how little is to be gained by waiting to see if there is going to be a further recurrence before considering the question of surgical intervention. The

importance of recurrent bleeding is more apparent when one recalls that grave complications were present in only 11 of the 51 patients dying from recurrent bleeding as opposed to 10 of the 15 dying from a first haemorrhage; thus if we deduct these cases from each of the two groups

TABLE XI.—*Effect of Recurrence (Various Authors)*

	Single Recurrence		Multiple Recurrence		Total	
	No.	Died	No.	Died	No.	Died
Cullinan and Price (1932) .. ..	18	4 (22%)	21	12 (60%)	39	16 (40%)
Baker (1947) ..	151	44 (29%)	34	14 (40%)	185	58 (31.4%)
Avery Jones (1947)	46	9 (20%)	57	17 (30%)	103	26 (25.3%)
Present series ..	83	32 (38.5%)	41	19 (46%)	124	51 (41%)
Total .. ..	298	89 (30%)	153	62 (40%)	451	151 (33.4%)

we obtain: 5 deaths (1.45%) in 342 patients without recurrent bleeding, and 40 deaths (35.4%) in 113 patients with recurrent bleeding.

This shows that, whereas recurrent bleeding by itself often causes death, a first haemorrhage is rarely fatal in the absence of complications.

Throughout all these years blood was readily available from the blood bank and was freely used. Not all fatal cases were transfused, because, as shown earlier, some were suffering from complications which would have made transfusion merely one further hazard. But, however much blood was used, there were some patients who bled so rapidly or so persistently that it was impossible to maintain an adequate circulation.

The reason for this was obvious at necropsy, which was performed in 32 of the 66 fatal cases. In every case an ulcer was found; two had perforated and so caused death, and in 24 of the remaining 30 an eroded artery was present in the ulcer base. In addition, spurting arteries in the ulcer base were seen at operation in two patients who recovered and in one who died but did not come to necropsy.

### Surgical Treatment

There is general agreement that an eroded artery of some size is commonly found in the base of the ulcer in fatal cases (Heuer, 1946; Avery Jones, 1947). Conservative treatment of bleeding from a vessel in an ulcer probably immobile through adherence to other structures seems to us to be a hazardous procedure, depending for success as it does upon the formation of enough firm adherent clot at the bleeding-point. Not infrequently arrest of the haemorrhage does occur in this fortunate manner, and the patient recovers (if he does not bleed again); but often the bleeding does not cease. Therefore the question of direct operative attack on the bleeding-point must at least be considered when it is felt that the haemorrhage may be coming from an eroded artery.

In this hospital, as in most clinics, operative treatment for bleeding peptic ulcer was undertaken only after severe long-continued bleeding (11 cases with 7 deaths), or when some complication forced the issue (4 times for severe pyloric stenosis, once for perforated duodenal ulcer—all fatal).

Obviously these results in no way reflect the surgical risk involved in operating on patients who are not in such desperate straits. The mortality rate and necropsy findings in this and other reported series show that some cases at least must be treated surgically. The most pressing problem must be the group showing the highest mortality under the present methods of treatment—namely, those

who suffer a recurrence of bleeding, especially those aged over 50 (Table IX). Other reported series agree in showing an alarmingly high mortality in the "recurrent" group (Chiesman, 1932; Cullinan and Price, 1942; Avery Jones, 1947).

For several years Finsterer (1947) has strongly advocated early operation—immediate if the patient's history makes it probable that he is suffering from a chronic peptic ulcer, but after the first recurrence if there is no such history. More recently, Tanner (1949a, 1949b) has adopted this routine. Despite the good results obtained in their hands this seems inadvisable as a general policy, because most patients who are bleeding even from a known peptic ulcer are not in danger under conservative treatment. Even in the "recurrent" bleeding group those patients already known to be suffering from a peptic ulcer fared no worse than those with no definite history: among 39 patients known to be suffering from peptic ulcer there were 15 deaths, and among 85 not known to be suffering from peptic ulcer there were 36 deaths.

Sometimes the patient is bleeding from an acute ulcer, as indeed was the case in two of the men who were treated surgically; both survived, but both had bled very alarmingly for several days before operation was decided upon; Ives (1949) quotes two similar cases. In our series death was due to recurrent haemorrhage from acute D.U. in one man and acute G.U. in two women: eroded arteries were found in the base of two of these ulcers—a finding in agreement with Heuer (1946). Therefore, although it is true that haemorrhage from an acute ulcer is less likely to prove fatal than that from a chronic ulcer, it seems that this may be only because acute ulcers are less apt to cause severe recurrent haemorrhage; but when they do so they may cause death.

Analysis of the results in the present series shows that the first recurrence of bleeding was the real warning of the grave danger which threatened these patients (Table XI). Little further information could be obtained by waiting, or at least not until an almost terminal stage, which was too late to be useful. If operation is to be done it should be carried out as soon as the patient can be resuscitated from the shock of this first recurrence. The problem arises whether the risk of operating at the time of the first recurrence on all such patients, including those who would survive if treated medically, is outweighed by the gain in operating on all those who would die without surgical intervention.

We weighed up all the available information obtained from a careful study of the case notes of the 124 "recurrent" cases and found it possible to classify the patients into three groups as regards operability at the time of the first recurrence (Table XII).

In the group with the worst prognosis—namely, the 72 "recurrent" cases aged over 50, of whom 41 (57%) died—we find that 47 were certainly operable, and 24 of these died (but in 5 of these 24 fatal cases the bleeding was so rapid that only a speedy decision to operate could have

prevented death). Operation at the time of the first recurrence should improve the results in this type of case. The indications in those aged under 50 are less definite.

The question of what operation should be done depends to a great extent on the individual case, and must be left to the discretion of the surgeon at the time of operation, but it seems that the actual bleeding-point should be removed if at all possible, and partial gastrectomy, including removal of a duodenal ulcer, seems to be the operation of choice (Ives, 1949; Tanner, 1949b). Lesser measures, such as simple oversewing of the ulcer, cannot always be relied on to stop the bleeding (Heuer, 1946; Baker, 1947; Ives, 1949). If gastrectomy with removal of the part of the duodenum containing the ulcer is done and the patient survives, his future prospects of freedom from ulcer pains, haemorrhage, or perforation should be better than if the ulcer were still present. This would apply especially to the patient with a long-standing history of persistent pain, for whom partial gastrectomy is often done even apart from any question of haemorrhage. However, these are difficult cases requiring much experience in gastric surgery, and in the weaker patients Tanner (1949a, 1949b) advises that a modified procedure be used.

When a chronic ulcer is not found it would probably be wiser to do a partial gastrectomy (Ives, 1949), at least in patients over 50, and especially if there is a long history of dyspepsia. Operation will be done only in patients who have suffered recurrent haemorrhage, and, as we have seen, eroded arteries of some size may be found in small acute ulcers.

*Associated Pyloric Stenosis.*—Pyloric stenosis, by which we mean not merely transient pylorospasm, was present in 25 cases (5%), and proved to be a dangerous complication, as 12 of those 25 patients died. It occurred more commonly in the higher age group (age less than 50 years—4 cases, 1 death; age over 50—21 cases, 11 deaths). Operation was carried out in nine cases because of the combination of bleeding and stenosis, and six of these patients died. Of the 16 treated without operation six died. It seems unlikely that any of the nine patients operated upon would have survived without surgical intervention. The operative mortality was high, but since operation was done on the worst cases, excluding those actually moribund, the conservative and operative treatment cannot be compared.

Baker (1947) pointed out the poor prognosis which attends a combination of pyloric stenosis and recurrent haemorrhage; the present series bears this out (see above), and it seems that this is an added indication for operation at the time of the first recurrence.

**Surgical Consultation**

It has been suggested that cases of gastro-duodenal haemorrhage should be admitted direct to a surgical ward, but this view is not likely to gain general support, because in the majority of cases there is never any question of necessity for surgical treatment; moreover, medical wards are usually quieter and more restful than surgical wards, and quiet surroundings are important in the treatment of bleeding from peptic ulcer. But it is necessary to avoid delaying consultation with the surgeon until the patient is in a very weak state and appears about to die fairly soon under continued medical treatment. Surgical consultation should not automatically mean that an operation will be done. A reasonable arrangement, which would ensure that the surgeon's time is not wasted in seeing many patients unnecessarily, but which would enable him to see at an early stage those in whom operation must be

TABLE XII.—Operability at First Recurrence

Age		Group 1: Operable	Group 2: Probably Operable	Group 3: Not Operable	Total
50 plus ..	Survived Died	23	6	2	31
		24	7	10	41
Less than 50	Survived Died	42	0	0	42
		9	1	0	10
Total ..		98	14	12	124

considered, would be to regard the first recurrence of bleeding in all cases, below 50 years of age as well as above, as an indication for joint medical and surgical consultation on immediate treatment. Furthermore, such a definite plan would make it possible to deal promptly with those patients who bleed rapidly at the time of the first recurrence.

### Summary and Conclusions

An analysis of the case notes of the 476 patients admitted to the medical wards of the Aberdeen Royal Infirmary on account of haematemesis and/or melaena from peptic ulcer during the years 1941-8 inclusive is presented. Reference is made to some of the publications on this subject.

Sixty-six patients died: this mortality of 13.9% probably represents that obtained in most general hospitals; therefore many patients still die from this complication of peptic ulcer.

In the 298 cases in which the ulcer site was known, duodenal ulcer was found to be five times more common than gastric ulcer.

The difficulties in deciding whether the bleeding is coming from an acute or from a chronic ulcer are discussed. The risk of death from bleeding from an acute ulcer is less than when the bleeding is coming from a chronic ulcer, but is by no means negligible.

There was a sudden marked increase in the mortality at the age of 50; the next sharp rise did not occur until 70; 53% of the patients were over 50.

The mortality rate was not higher in the group of patients who gave a history of one or more previous haemorrhages.

It was difficult to judge the degree of the severity of the bleeding. The hourly pulse chart was a useful guide, but in many patients who died the pulse rate never reached even 120, much less the 140 beats a minute often considered to be an indication for starting blood transfusion.

Recurrent haemorrhage after admission to hospital was the most reliable warning of the serious nature of the bleeding in all age groups, the risk of dying being eight to ten times greater in the recurrent group. An eroded artery in the base of an ulcer is usually the source of this type of haemorrhage.

The limitations of medical treatment and the possibility of employing surgical measures for recurrent bleeding are considered, and it is concluded that surgical treatment is indicated in the majority of patients aged over 50 who suffer a further haemorrhage after admission to hospital.

A scheme for close co-operation between physician and surgeon over these cases is suggested.

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## HAEMORRHAGE FROM PEPTIC ULCER

### A REPORT ON 170 CASES

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The general trend of mortality from gastro-duodenal haemorrhage has fluctuated considerably since the beginning of the century. Mortality was relatively low at 4% to 7% during the first 20 years, but from 1920 to 1935 the reported figures showed a rise to 25%. More recently there has been a general fall to a level of 8% or below. The explanation of these variations has been considered in detail by Avery Jones (1947), to whose writings reference is advised.

The recent decline in mortality is generally attributed to the introduction of drip-transfusion by Marriott and Kekwick (1935), to the wider recognition of the need of these patients for an adequate fluid intake, and to the abandonment of complete starvation as a routine treatment. Lewin and Truelove (1949), however, seemed to sound a note of alarm. They reported a mortality of 16.6% in a series of 252 cases of haemorrhage from peptic ulcer admitted to the Radcliffe Infirmary over a period of 10 years (1938-47), and speculated on the advisability of gastrctomy as a prophylactic measure in patients of middle age with a known peptic ulcer.

The cases which we wish to record include all patients with gastro-duodenal haemorrhage encountered over a period of seven years (1941-8). This period is not a selected one; it is simply the time during which the wards concerned have been under the charge of one of us (A. G. O.).

The clinic serving these wards is a general medical clinic in a teaching hospital, and if it has a bias this is not in favour of gastro-enterology. Gastric cases receive ordinary and careful treatment (we believe), but no claim to any special interest or experience in this type of case is made. To our treatment of peptic haemorrhage the same remarks apply, and yet we have not found that this complication holds any remarkable terrors.

The general line of treatment may be briefly summarized. Morphine is administered on admission as a general rule and 6-oz. (170-ml.) milk feeds are given every two hours. Fluid by mouth is encouraged in addition to this, and little difficulty has been experienced in maintaining an adequate intake by this route. Magnesium trisilicate is given only if the patient complains of pain. A routine daily dose of 150 mg. of ascorbic acid was given (this was later increased to 500 mg). Iron is administered at a later stage if required for anaemia.

The criteria of the need for blood transfusion have been two in number—the hourly pulse rate and our personal assessment of the patient's condition and progress. The blood pressure and the haemoglobin level have been taken into account, but have not been allowed to deflect our judgment. The necessity for maintaining an adequate haemoglobin level as a condition of general recovery and local healing, as emphasized by Avery Jones, has been recognized. A study of the cases in retrospect has shown a tendency for transfusion to be employed more often in the treatment of those patients with low haemoglobin levels and low blood pressure, but patients with normal or slightly subnormal readings were among those in whom