National Health Service. By taking oxygen after temporary exertion beyond their real capacity, such as going upstairs, they can shorten the period of acute respiratory distress. The cylinder is also useful for operating the nebulizer for the relief of bronchospasm.

Summary

Coal-workers' pneumoconiosis has two forms: simple pneumoconiosis, which is rarely a cause of severe disability except in elderly men; and complicated pneumoconiosis, which may cause severe disability after the age of about 35 and is a modified form of tuberculosis.

Under the present regulations men with either form are eligible for compensation. The number of new cases being certified annually in areas other than South Wales is increasing. The benefit paid is determined by the severity of disability and not by the degree of abnormality of the chest film. Miners receiving compensation may continue to work underground under dust-approved conditions if they wish.

Advice on the nature of the disease, compensation, and re-employment is of special importance in the management of these cases, as misunderstandings are apt to arise. These are discussed in some detail. There is need for more exchange of information between the doctors with whom a miner with pneumoconiosis is likely to consult.

Treatment of the acute pulmonary infections, bronchospasm, and cor pulmonale, and some of the principal symptoms in these cases, is briefly described.

We wish to express our thanks to Dr. J. C. McVittie, of the Ministry of Pensions and National Insurance, for help in preparing the section on compensation. We are grateful to Dr. J. M. Rogan, of the National Coal Board, and to our colleagues in the Pneumoconiosis Research Unit for their helpful criticisms.

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In his annual report for 1954 Dr. J. F. WARIN, the principal school medical officer of the City of Oxford, describes the steps that are being taken to prevent food-poisoning at school canteens. About 200 people are employed in the school canteens in Oxford, and a full medical examination and a chest radiograph have been a condition of employment for the administrative staff for some time. There is a higher labour turn-over among the manual workers in the canteens, and before they are employed they are asked detailed questions about any intestinal illnesses they may have had in the past. If there are reasons for doubts about a prospective employee's freedom from transmissible disease, then a full medical examination is arranged and blood and stool specimens are sent to the laboratory. Manual workers have a chest radiograph as a condition of employment. Posters illustrating the prevention of food-poisoning are on display in the school canteens, and it is intended that members of the chief sanitary inspector's staff will give talks to canteen workers on this important subject. When selected groups of the population in Oxford were offered examination at the miniature camera unit last summer canteen workers were included. The response to this offer was 100%. No case of active tuberculosis was detected.

HAEMATEMESIS

WITH SPECIAL REFERENCE TO PEPTIC ULCER

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Haematemesis (including melaena) is one of the common emergencies met with in hospital practice. The most usual cause of the condition is chronic peptic ulcer, which is on the increase. At the present time the population is becoming increasingly loaded with middle-aged and elderly people, who are both more liable to suffer from chronic peptic ulcer and less able to survive blood loss than are young adults. For these reasons, the methods used in treatment must be kept under continuous review. We have therefore examined the experience of the Radcliffe Infirmary during a recent five-year period (1948–52 inclusive) and compared it with the findings of a similar study made for the previous decade (1938–47) by Lewin and Truelove (1949).

Data

The sources of data of this study are the in-patient notes of the Radcliffe Infirmary, which is the only general hospital taking in emergencies from the City of Oxford and a considerable rural area surrounding it. Hence the patients can reasonably be regarded as an unbiased sample. Case notes of all patients (other than children) presenting as emergencies because of haematemesis or melaena during the five-year period 1948–52 have been examined. Trivial cases in which there was no evidence of serious bleeding have been excluded.

In considering the fatal cases we have adopted the criteria of Avery Jones (1952) in excluding only those deaths due to unrelated diseases or to elective operation after recovery from the bleeding. We have included all other cases with serious complications, among them (1) patients who have haematemesis or melaena following a perforated peptic ulcer, a group excluded by Avery Jones (1947) because of their special nature; and (2) patients who were already in hospital because of a serious disease which terminated in severe gastrointestinal bleeding, sometimes diagnosed only at necropsy.

Results

During the five-year period of 1948–52 there were 540 emergency cases of haematemesis and melaena, compared with 305 during the previous ten years. During the five years under consideration the annual rate of admission for haematemesis and melaena increased steadily from 87 in 1948 to 142 in 1952, a change related to the increasing frequency of peptic ulcer. The cause of the bleeding was classified under the following headings: (1) chronic peptic ulcer (377), (2) acute peptic ulcer (84), (3) oesophageal varices (23), (4) carcinoma of the stomach (20), and (5) other causes (36). The criteria used were the same as those used previously by Lewin and Truelove (1949).

The miscellaneous collection of cases which we have grouped together under "other causes" were as follows: hereditary telangiectasia, 5 (4 admissions were of one patient); hiatus hernia, 5; unknown, 26. Of the unknown group, there was evidence later of a gastric or duodenal ulcer

in nine of the patients. In none of the others was any later diagnosis made to suggest the cause of the bleeding.

The fatality rate of the present series shows a sharp decline from that of the previous ten years. For the total series, the fatality rate has dropped from 19.0% to 8.3%. For the chronic ulcer group, which is the biggest and most

FIG. 1.—Whole series. Fatality rate by age groups.

FIG. 2.—Chronic ulcer group. Fatality rate by age groups.

of patients over 50 than the earlier, as shown in Table III. The lowered fatality rate is therefore not due to any favourable change in the age composition of the series. On the contrary, the circumstance that approximately two-thirds of all the patients were over the age of 50 is a striking feature of the present group.

TABLE I.—Fatality Rate from Haematemesis by Age. Total Series

Age Group	1938-47			1948-52		
	No. of Cases	Deaths	Fatality Rate	No. of Cases	Deaths	Fatality Rate
Under 30 ..	26	0	0%	30	0	0%
30-39 ..	42	3	7.1%	45	1	2.2%
40-49 ..	67	5	7.5%	99	2	2.0%
50-59 ..	84	19	22.6%	137	16	11.7%
60-69 ..	56	18	32.1%	141	12	8.5%
Over 70 ..	30	13	43.3%	88	14	15.9%
Total ..	305	58	19.0%	540	45	8.3%

TABLE II.—Fatality Rate from Haematemesis by Age. Chronic Ulcer Groups

Age Group	1938-47			1948-52		
	No. of Cases	Deaths	Fatality Rate	No. of Cases	Deaths	Fatality Rate
Under 30 ..	18	0	0%	17	0	0%
30-39 ..	30	2	6.6%	35	0	0%
40-49 ..	44	4	9.1%	83	0	0%
50-59 ..	59	15	25.4%	94	8	8.5%
60-69 ..	41	13	31.7%	88	5	5.7%
Over 70 ..	16	5	31.2%	60	8	13.3%
Total ..	208	39	18.8%	377	21	5.6%

TABLE III.—Percentage of Patients Over the Age of 50 in the Two Consecutive Series

Series	Whole Series	All Peptic Ulcers	Chronic Ulcers
I (1938-47) ..	55.7	54.4	55.8
II (1948-52) ..	67.8	65.3	64.2

Effect of Sex

Table IV shows the chronic ulcer group broken down into two main age groups and by sex. It will be seen that the difference in fatality in the two sexes is small, although women may be somewhat less prone to die. Another feature of interest is the different proportion of women in the two age groups. It will be seen that below 50 the male:female ratio is about 4:1, whereas above 50 it is less than 2:1. This is presumably related to the liability of women to develop chronic peptic ulcers after the menopause, although they are relatively free from them before. During these last five years the proportion of women in the over-50 age group is noticeably higher than it was in the earlier series, although the proportion of women in the under-50 age group is the same as it was before.

TABLE IV.—Fatality Rate by Age and Sex. Chronic Ulcer Group

Age Group	Men		Women	
	No. of Patients	Deaths	No. of Patients	Deaths
Under 50 ..	107	0 (0.0%)	28	0 (0.0%)
Over 50 ..	155	16 (10.3%)	87	5 (5.7%)
	262	16 (6.1%)	115	5 (4.3%)

Recurrent Bleeding

The most important single variable other than age which affects prognosis is the liability of a patient to continue to bleed freely or to have recurrent bleeding after admission to hospital, as has been particularly well demonstrated by Avery Jones. In this connexion it is worth mentioning that the proportion of patients who exhibited recurrent bleeding was closely similar in the two Radcliffe Infirmary series. In each series about one-third of the patients had a recurrent haematemesis or other evidence of continued bleeding after admission to hospital.

It is sometimes assumed that the longer an ulcer has existed the more likely it is to give rise to recurrent bleeding. In this series the length of ulcer history had no influence on liability to recurrent bleeding. In 101 patients with a history of chronic ulcer of less than five years the incidence of recurrent bleeding was 35%, while in 207 patients with a history of more than ten years the incidence was 32%.

Likewise, neither a history of previous haematemesis nor the age of the patient has any bearing on the liability to recurrent bleeding, as shown in Tables V and VI, and as previously found by Lewin and Truelove (1949).

TABLE V.—Incidence of Recurrent Bleeding in Patients With and Without a History of Previous Haematemesis. Chronic Ulcer Group

	No. of Patients	No. with Recurrent Bleeding
With previous bleeding ..	108	37 (34.2%)
No ..	256	84 (32.8%)

TABLE VI.—Incidence of Recurrent Bleeding in Two Main Age Groups. Chronic Ulcer Group

Age Group	No. of Patients	No. with Recurrent Bleeding
Under 50 ..	135	41 (30.4%)
Over 50 ..	229	80 (34.9%)

Treatment

It has been the practice in the Radcliffe Infirmary for patients with haematemesis to be admitted under the care of a physician and for initial treatment to be medical rather than surgical. About 7 out of every 10 patients in the peptic ulcer group made an uneventful recovery without evidence of recurrent bleeding on orthodox medical treatment—namely, rest, a bland diet, and blood transfusion when indicated. The proportion of patients who made an uneventful recovery on medical treatment is a little higher in

TABLE VII.—*Proportion of Patients Making an Uneventful Recovery on Medical Treatment. Peptic Ulcer Group*

Age Group	No. of Patients	No. Making Uneventful Recovery
Under 50	160	117 (73.1%)
Over 50	301	196 (65.2%)

the younger than in the older age groups, as shown in Table VII, but the difference is not marked.

Whereas in the previous ten years the part played by surgery was negligible, during the recent five years emergency surgery has often been used. Although there has been no rigid uniformity of policy among the various physicians and surgeons concerned, the usual course of action has been to employ medical treatment and to resort to surgery when there has been evidence of continued or recurrent bleeding and the presence of a peptic ulcer has been known or suspected. In all, 76 out of the 461 patients with chronic or acute peptic ulcer were treated by emergency partial gastrectomy—that is, 1 in 6. We have defined an emergency partial gastrectomy in this context as an operation done for the immediate arrest of dangerous bleeding. A partial gastrectomy carried out after bleeding had stopped for more than 24 hours but less than a week has been classed as an early elective operation; there were 38 such operations, or 1 in 12.

Following the 76 emergency operations there were 7 deaths (9.2%). None of these occurred in the 20 patients who were aged less than 50 years. Hence there were 7 deaths (12.5%) among the 56 patients over 50 years old. The operative fatality among patients over 50 was therefore considerable, but we must remember that the patients selected for emergency operation were those who would have had a high fatality rate with medical treatment, almost certainly much higher than occurred with surgery.

Of the 76 emergency operations, 66 were performed on patients in the chronic ulcer group, with 6 deaths (9.1%). The remaining 10 emergency operations were carried out for acute ulcer, and there was 1 death. Thus there is no obvious difference between the results of surgery in the acute and chronic ulcer groups.

It has already been noted that 20 of the emergency operations were carried out on patients under the age of 50. At the other end of the age scale, 14 emergency operations were carried out on patients over the age of 70 with 2 deaths, a fatality rate not appreciably different from the group between 50 and 70, as will be seen from Table VIII.

TABLE VIII.—*Operative Fatality Rate in Relation to Age*

Age Group	No. of Cases	No. of Deaths
Under 50	20	0
50–69	41	5 (12.2%)
Over 70	15	2 (13.3%)

It is of some interest that the only emergency operation done in the chronic ulcer group has been partial gastrectomy with excision of the ulcer. Before the start of the present series in 1948 other operations, such as ligation of vessels from within or without the stomach, cauterization, or oversewing of the ulcer had been practised. This change has been due to the individual choice of each surgeon, since uniform lines of treatment for the whole hospital by formal agreement of the staff do not exist at the Radcliffe Infirmary. The completeness of the change is therefore all the more striking.

Deaths

The total number of deaths in the chronic peptic ulcer group (377 admissions) was 21, but this includes 11 deaths which we regard as inevitable because there was some other grave disease in addition to the haematemesis. Many authors exclude such cases from their series. If we had done the same the fatality rate in this group of patients

would be 2.7% instead of the figure of 5.6% referred to in an earlier section. Brief details of the deaths are as follows:

Preventable (10 deaths).—Those deaths which occurred among patients without grave, unrelated, complicating diseases. Four of these patients died without surgical operation, and six died after emergency partial gastrectomy.

Inevitable (11 deaths).—Those deaths occurring in patients who suffered from a grave illness unrelated to the ulcer. In some of these cases the occurrence of massive bleeding was found only at necropsy. The nature of their complicating illnesses was as follows:

(1) Man aged 56. Admitted with coronary thrombosis. Arterial embolism of leg. Amputation and re-amputation. Collapsed and died suddenly. At necropsy, massive bleeding from a large benign gastric ulcer was found.

(2) Man aged 59. Admitted with acute appendicitis and general peritonitis. Developed severe recurrent haematemesis and was too ill for operation.

(3) Man aged 59. Admitted with haematemesis from chronic duodenal ulcer. Suffered from severe chronic tuberculous empyema with multiple sinuses and destruction of right lung.

(4) Woman aged 57. A severe chronic bronchitic admitted with bronchopneumonia and cardiac failure. Developed massive haematemesis from duodenal ulcer.

(5) Man aged 65. Admitted with carcinoma of gall-bladder with multiple metastases. Died suddenly. Necropsy showed two gastric ulcers and a duodenal ulcer with a large amount of fresh blood in stomach and small intestine.

(6) Man aged 68. Had previously had removal of carcinoma of rectum with local metastases. Was ill at home with diagnosis of carcinomatosis until admitted moribund. Died in three hours. Necropsy showed inhaled vomit, gross pyloric stenosis, and a duodenal ulcer which had bled.

(7) Man aged 70. Admitted for prostatectomy. On twelfth day had massive haematemesis and died in three hours in spite of transfusion. Necropsy showed large gastric ulcer which had eroded an artery.

(8) Man aged 75. Admitted with obstructive jaundice due to gallstones. Had suffered from intermittent attacks of jaundice with rigors for four years. Had haematemesis and quickly died. Necropsy showed two duodenal ulcers with fresh blood in intestine, cholelithiasis, and fibrosis of liver.

(9) Man aged 75. Admitted in coma due to metastases from carcinoma of the prostate which had been previously removed. Had recurrent haematemesis and died in four days. Necropsy showed bleeding chronic gastric ulcer and lobar pneumonia in addition to carcinomatosis.

(10) Man aged 81. Had a six-year history of hypertensive cardiac failure with auricular fibrillation. Admitted with haematemesis. Was in heart failure on admission. Had recurrent haematemeses and died on eleventh day. Necropsy showed two large chronic gastric ulcers, one of which had eroded an artery, and an enormous heart with generalized atheroma.

(11) Woman aged 71. Admitted with acute intestinal obstruction due to carcinoma of ascending colon. Following a hemicolectomy, had severe recurrent haematemeses and died. Necropsy showed four chronic gastric ulcers.

Discussion

In the present series peptic ulcer was by far the most common cause of haematemesis, accounting for 85.4% of the admissions—that is, about 17 out of every 20. The next most common single cause was bleeding from oesophageal varices due to portal hypertension, which accounted for 4.3% of admissions. In almost all these latter patients the diagnosis was apparent on admission; in fact, most of them were already under medical supervision for the underlying cause of their portal hypertension, and splenomegaly was almost invariable. Carcinoma of the stomach is also a fairly common cause of haematemesis, accounting for 3.7% of admissions; if the diagnosis is not obvious it may be confused with simple peptic ulcer, but the initial treatment is the same. The haemorrhagic disorders usually present other signs of the underlying disorder. Other causes are not common but are extremely diverse, and in some cases the diagnosis remains unknown. In such circumstances it is probably best to assume that the bleeding is from a peptic

ulcer, because the odds are in favour of this possibility even in the absence of a history of dyspepsia. Moreover, if the case is managed along lines suitable for peptic ulcer, little harm will usually be done if the source of bleeding proves to be some other lesion.

There is still no general agreement on the best course of treatment for haematemesis in patients with known or suspected peptic ulcer. Three schools of thought exist (Tanner, 1951; Avery Jones, 1952). The "conservative" school believes in treatment on purely medical lines with sedation, bland diet, correction of dehydration, and blood transfusion. Surgery is either not used or resorted to as a final desperate measure. Another group practises "selective surgery" (Tanner, 1950), carrying out emergency partial gastrectomy in those patients with peptic ulcer who are known to be poor risks with medical treatment. These are mostly patients over 50 with continued or recurrent bleeding after admission to hospital, as has been convincingly demonstrated by Avery Jones (1947). The third school of thought, often associated with the names of Finsterer and of Gordon-Taylor (1937), believes in "early surgery as the treatment of choice" (Finsterer, 1939) in all patients in whom there is a previous history suggestive of chronic peptic ulcer and in the absence of serious unrelated disease.

In connexion with these various approaches to treatment, it is of interest that the fatality rate from haematemesis in patients admitted to the Radcliffe Infirmary was much lower during the period covered by the present series (1948-52) than it was during the preceding decade. This fall in fatality has occurred in spite of a bigger proportion of elderly patients and with as big a proportion showing recurrent bleeding after admission. A number of improvements in medical care have doubtless assisted in this change, particularly improvements in blood transfusion and the development of antibiotics. However, we are satisfied that a major cause of the improvement has been the more frequent resort to surgery.

In general, the plan followed has been that of "selective surgery" as defined above, although a number of the patients who fulfilled the criteria for surgery were treated medically throughout, particularly at the beginning of the period under review. However, the age of the patient has not been regarded as an important factor in deciding against surgery. Twenty patients aged less than 50 were treated with emergency partial gastrectomy without a single fatality. It is often taught that emergency operation is inadvisable in patients aged over 70, but in this series there were 15 emergency operations on such patients, with only 2 deaths. The factor of age in deciding on operation is of importance only when there is genuine doubt whether operation is indicated. In such circumstances one can afford to wait events if the patient is young, as he will probably survive a further haemorrhage, but if he is over 50 it is probably wiser to decide in favour of emergency surgery without delay.

The present series yields no direct evidence on the value of "early surgery as the treatment of choice" in all patients with known or suspected peptic ulcer. However, it may be relevant that 7 out of every 10 patients in the peptic ulcer group made an uneventful recovery on medical treatment. While early surgery might improve the expectation of the remaining 3 in every 10 who are fated to have recurrent bleeding after admission, it would expose all the peptic ulcer patients to a major operation at a time when they may not be in the best condition for it and when the majority would recover uneventfully from their present haemorrhage without surgery. However, the issue is not entirely straightforward, for many of the patients who are treated medically will need surgical treatment later or may have a further complication of the ulcer, so that a correct comparison of the two methods ("selective surgery" and "early surgery as the method of choice") should include a follow-up study. Even in the brief time between the admission of the patients of this series and the end of 1953 53 of the 258 patients

with chronic ulcer surviving their haematemesis without emergency operation have required surgical treatment in the Radcliffe Infirmary, in some cases because of emergencies due to the ulcer, such as another major bleed or a perforation.

Summary

During the period 1948-52 540 cases of haematemesis or melaena presented as emergencies in the Radcliffe Infirmary. The results of treatment have been compared with those obtained in the previous decade.

Peptic ulcer was the most common cause of bleeding, accounting for 17 out of every 20.

The overall fatality rate was 8.3%. For 377 patients with good evidence of chronic peptic ulcer the rate was 5.6%.

Among the chronic ulcer group, about 1 in 3 suffered from continued or recurrent bleeding after admission to hospital. The chance of recurrent bleeding occurring while still in hospital is not appreciably influenced by age, length of ulcer history, or a past history of haematemesis.

Of the peptic ulcer group, 7 out of every 10 made an uneventful recovery from bleeding on medical treatment. One in every 6 had an emergency partial gastrectomy for bleeding, with a fatality rate of 9.2%.

The scope of emergency surgery in the treatment of haematemesis has been discussed. Nine out of every 10 cases of haematemesis are likely to be due to peptic ulcer or gastric carcinoma, and surgery may be the wisest treatment in any of these who show evidence of continued or recurrent bleeding.

We wish to thank the physicians and surgeons of the Radcliffe Infirmary for permission to make this study. We are also grateful to Miss P. Coombes, the records officer, and Miss B. Merry and Mrs. M. Eastway of her staff, for their assistance.

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"Maggots taken from a dead body are sometimes received with a request for identification and an opinion on their age, in case this may assist in fixing the time of death," writes J. A. Reid in Bulletin No. 7 from the Institute of Medical Research, Federation of Malaya. He explains that it is difficult to deduce precisely from maggots the time of the host's death because of the rapid decay in the Malayan climate. The presence of full-grown maggots of the flesh-fly suggests that death occurred at least three days before, of blow-fly maggots that it occurred at least six days before. But the victim may have had a fly-blown wound before death. The sequence in the processes of decay and the insects associated with them, the lapse of time between death and the laying of the first eggs, and the duration of the various larval stages of the different flies have not been fully worked out in Malaya; consequently the time of death cannot be very accurately gauged. In 1950, however, Dr. H. M. Nevin, a pathologist, examined some young maggots collected from the body of a woman shot by bandits in Penang, and Mr. Reid's identification of them as second-stage larvae of the blow-fly between 16 and 24 hours old agreed with police evidence that the woman had been killed less than 24 hours earlier. For forensic investigation, half the maggots collected from the body should be killed in boiling water and preserved in 70-80% alcohol to show their age at the time of collection, and the other half should be sent alive so that by breeding to maturity the adults may be used to check identification.