TREATMENT OF HAEMORRHAGE FROM PEPTIC ULCER BY CONTINUOUS INTRAGASTRIC MILK DRIP

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"Where is the man who can live without dining?"

—EDWARD BULWER-LYTTON (*Owen Meredith*).

During the last century haemorrhage from peptic ulcer was treated by rest, starvation, and opium. The patient, anxious and weakened from blood loss, lay flat, enduring starvation and dehydration, ice being applied to his abdomen and parched lips. In a widespread belief that the giving of blood restarted haemorrhage, transfusion was withheld and enfeeblement prolonged.

Literature

Early in the present century, Lenhartz (1904) advised feeding with milk and raw eggs from the first day. However, many hospitals in this country continued to employ initial starvation until Meulengracht (1934) introduced a further plea for early generous feeding. "It seems doubtful," he wrote, "whether it be particularly expedient to pick out for weakening dietetic measures the very point of time when a patient has lost a considerable amount of blood and is rather poorly." The 'thirties saw other important therapeutic advances: Marriott and Kekwick (1935) demonstrated the importance of adequate transfusion; Finsterer (1933) made, and Gordon-Taylor (1935) successfully defended, the case for early operation in patients with established ulceration and severe haemorrhage, pointing to lower mortalities if the gastrectomy was performed in the first 48 hours. Those tempted to question whether this advice is applicable now the patient has adequate food and transfusion during the first two days should note that Tanner (1951) has proposed, and is at present employing, a return to the Finsterer regime. Recent authors, such as Ogilvie *et al.* (1952), have stressed the importance of medico-surgical team-work in the management of bleeding ulcers.

With what appeared to be steady therapeutic advances in the first half of this century one would have expected a comparable decline in mortality. However, there was a rise during the first quarter of the century. The factors which caused this and led to subsequent confusion were stated by Avery Jones (1947) in the Goulstonian Lectures. Those wishing to learn the pitfalls of drawing conclusions from published mortalities are referred to these lectures.

Briefly, from 1902 to 1907 published ulcer mortalities were 7% or under. Some of these low figures gave a false impression of the mortality in the country as a whole as they came from teaching hospitals having a smaller proportion of indigent and elderly patients. Some series excluded cases transferred to surgical wards or did not take into account the overall hospital results. Omissions of deaths from causes related to the management of the haemorrhage were also common. Nevertheless, making

allowances for these factors, Avery Jones was able to show that there was still a lower mortality due to the greater prevalence of acute ulcers in young women at this time, whereas after 1920 there were many more chronic ulcers in males over 40.

Between 1920 and 1932 relatively high mortalities were published. In 1927 Bulmer reported a mortality of 10.7% and in 1932 one of 13.5%. More reports came in from municipal hospitals which had poorer and older patients, among whom there was a greater proportion of gastric ulcer and a greater expectation of death from peptic ulcer haemorrhage. Of Avery Jones's patients, 33% were over 60, whereas former voluntary hospital series might have had only 10% of patients above this age. Mass hospital surveys might show even higher figures, and Chiesman (1932) reported a mortality of 25%. Comparable figures did not come from other parts of the world, and in Denmark, Meulengracht (1939), using generous feeding, showed only 1% mortality. However, only 30% of these patients showed radiological confirmation of ulcer.

Between 1935 and 1953 the mortality fell once more, and Avery Jones's (1947) figure of 8% may now be taken as a standard. These years reflected the improvement following adequate transfusion (Marriott and Kekwick, 1935), generous feeding (Meulengracht, 1939), and planned surgery (Finsterer, 1936; Gordon-Taylor, 1937).

Treatment by Continuous Intra-gastric Milk Drip

Impressed by the ulcer patient's rapid recovery from pain on a continuous intra-gastric milk drip, we looked for further improvement in feeding methods for bleeding peptic ulcer by combining the continuous intra-gastric milk drip employed by Winkelstein (1933) with early generous feeding as recommended by Meulengracht, the former being given as soon as the patient had settled in hospital and had received his morphine, the latter as soon as he wanted it, usually the morning of the second day. It was argued that such a regime would give adequate fluid replacement, complete nourishment, relieve the patient's shock, and reassure him. Furthermore, the continuous buffering action of the milk would bring early relief from pain, set the stage for early healing, and prevent pepsin from dissolving blood clot in the vessel mouth and ulcer base. The high morale and freedom from exhaustion and prostration in these patients has encouraged us to continue with this regime, although there is statistically little difference in its results from the one, previously adopted, of one-hourly milk feeds on the first day followed by a liberal diet on the second. It should be pointed out that the earlier group were fed generously and must not be regarded as a control group treated by restricted feeding. Both groups of patients received adequate transfusion.

Technique

The apparatus was simple, consisting of a Ryle stomach tube, a glass connexion, two lengths of rubber tubing, a drip chamber from a transfusion set, and a flask to hold the milk (see Fig. 1). The siphoning bottles used by Woldman (1936) for the continuous aluminium hydroxide drip were not employed. The mechanism of the drip was explained to the patient in simple terms: "This neutralizes the acid in your stomach and allows healing to go on during the night." The Ryle tube was passed nasally to the second mark or until gastric juice was obtained, when it was withdrawn slightly and strapped to the side of the face. It was considered an advantage to have the tip of the tube high in the stomach in order to "bathe" the ulcer area, while avoiding direct trauma from the tube. The American authors used a Levin tube or a collapsible tube made of latex (Woldman, 1937). The Ryle tube did not block easily,

and when the drip stopped it could often be restarted by milking the tube. The tube would be changed at varying times determined by discomfort or blocking, usually 48 hours; sometimes it was used for as long as seven days without replacement.

Initially milk was contained in blood transfusion bottles, but later vacoliter flasks were used instead, these having to be changed less often. The smaller bottles were still employed during the hot summer months. Five or six pints (2.8 or 3.4 litres) of milk was run in during 24 hours. The

patient received a generous bland diet at four-hourly intervals while the drip was still running, and thus the total intake was in the region of 3,700 calories. This high-calorie feeding would be difficult to procure without employing continuous intragastric milk throughout the night.

The milk was usually unadulterated; on rare occasions aluminium hydroxide gel was added if there was some persistent pain unrelieved by the milk drip. In the earlier cases with recurrent bleeding, viper venom was added to the drip, but as it did not appear to influence the tendency to recurrences this practice was later discontinued. We have no experience of the addition of thrombin. Winkelstein's (1933) method of adding sodium bicarbonate was rejected, as continuous buffering was considered to be more important than rapid neutralization, and it was thought wiser to avoid the danger of alkalosis. The milk drip was preferred to the aluminium hydroxide drip employed by Woldman (1936), as the value of early nourishment with generous supply of calories, protein, and electrolyte was felt to outweigh the dangers of promoting peristalsis.

Nature of Series

The patients comprising this series have all been admitted to one of two of a small group of regional hospitals as emergencies with haematemesis or melaena due to peptic ulceration. They constitute the entire admissions of such cases in the group during the period between the summer of 1950 and the winter of 1953-4. In assessing the mortality no exclusions have been made for related deaths or the late complications of surgery. The proportion of peptic ulcer patients among the overall cases of haematemesis of the group is shown in Table I. The sex incidence, ulcer site, and mortality are shown in Table II.

TABLE I.—Total Emergency Cases of Haematemesis or Melaena During Same Period

Peptic ulcer	153
Carcinoma of stomach	8
Cirrhosis of liver	6
Oesophageal varices	1
Telangiectasis	1
Haemophilia	1
Uraemia	1

As the majority of patients were treated by the continuous intragastric milk drip after the summer of 1951, and the accuracy of the diagnostic indexing could not be ensured before the summer of 1950, the control group is a much smaller one.

Table III shows the distribution of the age groups and compares the mortalities with those of Cullinan and Price (1932) and Avery Jones (1943).

TABLE II.—Sex Incidence, Site, and Mortality

	Conventional Therapy and Early Feeding			Milk Drip			
	M	F	Total	Deaths	M	F	Total
Duodenal ulcer	17	7	24	1	51	15	66
Gastric ulcer	5	3	8	2	10	2	12
Gastric and duodenal ulcer	1	1	2	1*	12	6	18
Acute lesion	7	11	18		2	1	3
Stomal ulcer	2	—	2		1	—	1
Oesophageal ulcer	—	—	—		—	—	—
Total	32	21	53	4 (7.5%)	76	24	100

* Acute gastric erosion. † Acute gastric ulceration.

TABLE III

Age	Cullinan and Price (1932) (Haematemesis Only). Restricted Fluid Intake. Occasional Small Transfusions		Avery Jones* (Haematemesis Only). Generous Feeding—Witte's Regime. Adequate Drip Transfusion		Present series, 1951-3 (Haematemesis and Melaena). Continuous Milk Drip. Generous Feeding. Adequate Drip Transfusion	
	No.	Deaths	No.	Deaths	No.	Deaths
10-19	1	0	0	0	2	0
20-29	12	0	4	1	10	0
30-39	15	3	13	0	16	0
40-49	25	3	28	0	25	0
50-59	29	6	40	2	20	1
60-69	37	6	31	6	19	4
70-79	11	4	7	1	8	2
80+	0	0	3	0	0	0
Total	105	19	126	10	100	7

* Avery Jones excluded melaena alone from his figures for better comparison with Cullinan and Price's series. Our numbers are not large enough to make this worth while. Of our patients 27% were over the age of 60 and 47% over the age of 50. There were no deaths below the age of 52 and only one below the age of 60.

Analysis of Deaths.—In Table IV summaries of the seven fatal cases in the 100 drip-treated patients are given. In two cases death was directly due to haemorrhage. In two it was due to conditions associated with the management of the haemorrhage, and in three to later complications of surgery.

TABLE IV.—Analysis of Deaths

Age and Sex	Type of Ulcer	Operation	Day of Opn.	Cause of Death	Day of Death	Comments
M 52	G.U.	None		Haemorrhage	3rd	Sudden collapse. Necropsy: ruptured aneurysm of splenic artery in base of ulcer
M 67	D.U.	"		"	2nd	Necropsy: chronic nephritis, prostatic hypertrophy, hypertensive heart disease, duodenal ulcer
F 62	Acute G.U.	"		Pulmonary oedema	1st	Necropsy: aortic stenosis, acute pulmonary oedema, acute gastric ulcer
M 71	D.U.	Gastrectomy. Further opn.	1st 4th	Haemorrhage	5th	Haemostasis not secured at first operation
M 70	D.U.	Gastrectomy	2nd	Duodenal fistula and peritonitis	24th	
M 63	D.U.	"	14th	"	23rd	
F 60	D.U.	"	6th	"	12th	

Duration of Bleeding.—Fig. 2 is an assessment of the presence of occult blood in the stools (estimated in the laboratory by the benzidine test and in the ward by Gregerson's modification of it). A larger proportion in the continuous milk-drip group than the control group stopped bleeding between the 5th and 10th day, whereas the peak in the conventionally treated group was between

FIG. 2.—Showing duration of occult blood in stool.

the 10th and the 15th day. Turnbull and Sagi (1939) and Meulengracht (1934) have claimed earlier cessation of bleeding in groups of patients treated by initial feeding.

Recurrences.—At first sight the drip-treated group, though twice the size of the conventional one, gave rise to only six more recurrent bleedings. This figure is unconvincing when allowance is made for eight of the recurrences in the conventional group having occurred in one patient. If this patient is excluded one is unable to demonstrate a reduction in the number of recurrent bleeds in hospital as a result of drip treatment. Nevertheless it can be stated that to have more than two recurrences was exceptional in these 100 patients. The one with four recurrences had a deep penetrating posterior gastric ulcer, and his operation was deferred because of auricular fibrillation and congestive heart failure. Despite these handicaps he survived on medical treatment. The patient with eight recurrences in the conventionally treated group was bleeding from multiple gastric erosions, and died.

TABLE V.—*Recurrent Haemorrhages in Hospital*

	No. Treated	No. of Recurrences					
		1	2	3	4	8	Total
Conventionally treated ..	53	6		1	1	1	9 (21)
Drip treated	100	8	6	1	1		16 (27)

Patients' Views on Treatment

Few patients objected to the technique. Those who had had previous treatment of haemorrhage preferred the milk drip, particularly if the former treatment included a few days of restricted diet. They looked and felt confident and reassured on their second day. Confidence was often enhanced by seeing others in the same ward undergoing the same type of therapy. Some complained of mild nasal irritation and soreness of the throat, not severe enough to warrant discontinuation of treatment. By the end of the

first week this complaint became more frequent, and at this time it was usual to discontinue the drip but to maintain it at night for a further week. If there had been recurrent bleeding or if occult blood persisted in the stools the drips were continued for longer periods.

Patients could tolerate the drip for periods of six weeks. A few, asked to write down their impressions, even referred to a soothing effect of the steady flow. One man and one woman objected initially: the woman had objected to other forms of therapy; the man was old and querulous at 71 years. Two other women would not have the tube replaced after the fourth or fifth day. One of these had three recurrent bleeds but could not be induced to change her mind.

Views of Medical Attendants on Treatment

The doctors and nursing staff were impressed by the apparent well-being, reassurance, and confidence of the 84 patients out of the 100 who did not bleed again or who were not moribund on admission. The patients were propped up on the second day, taking generous meals in addition to the milk drip, looking and feeling comfortable. Sweating and anxiety were the exception, pulse and blood pressure had usually been restored. Their condition was in notable contrast to that of patients treated by initial starvation, and a further improvement on the state of those treated by early feeding without continuous milk drip. The 16 who bled again were more distressed, as the rejection of their tube with a bloody vomitus, sometimes repeated, would impair confidence. Nevertheless eight of these resumed their drip and progressed steadily to recovery. Some of the patients' minor discomforts might have been relieved by the use of the latex tube, advocated by Woldman (1936). It is unfortunate that the treatment is difficult to establish in elderly people with early recurrent haematemesis, as the danger lies with this group.

In only one patient, a man with an aneurysm of the splenic artery in the base of a large gastric ulcer, who died suddenly with massive bleeding, may the use of the tube have aggravated the haemorrhage.

Conclusions

The results are given of the treatment of 153 ulcer patients admitted to hospital as emergency cases for haematemesis or melaena. Of these, 100 were treated with a continuous intragastric milk drip given from the time of admission, and 53 were treated as a control group by one-hourly milk feeds and early generous step-up regimes. The drip-treated group received purées from the first or second day. Both groups were adequately transfused. The therapy does not prevent the occasion for surgery with continued bleeding in old people, nor has it so far produced a fall in the mortality of this group.

There was a tendency to diminished duration of bleeding in the drip-treated group. More than two recurrent bleedings in hospital were very uncommon in this group, but the numbers of recurrences under treatment do not differ significantly in the two groups.

The drip-treated group displayed earlier reassurance, confidence, and freedom from shock than the control.

Continuous milk-drip therapy for peptic ulcer haemorrhage can be carried out in hospital for periods of two or more weeks without inconvenience to the patient.

It can be affirmed that this is a safe treatment comparable in results to one-hourly feeding and transfusion regimes.

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STANDARDS OF FITNESS AMONG DRIVERS OF COMMERCIAL VEHICLES

A SOCIO-MEDICAL INVESTIGATION BASED ON WARTIME RECORDS OF CIVILIAN MEDICAL BOARDS

BY

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A recent lecture by the senior medical officer of the London Transport Executive describes in detail the steps taken to ensure that the drivers of London's motor-buses are healthy when recruited and maintain a satisfactory standard of fitness throughout their period of service (Norman, 1954). This leads one to consider what comparable steps are taken with reference to other professional drivers. So far as public service vehicles are concerned, the precautions taken seem to be adequate. The licensing authority, before granting permission to drive a bus or a coach, requires the applicant to have a general medical examination (including tests of vision) and to pass a special driving test. Many of the larger bus companies, including London Transport, conduct their own medical examinations and have even higher standards of vision and health than the statutory licensing authorities.

In contrast, no medical test is required of drivers of commercial vehicles, and inquiries into their fitness to drive are both limited and ill-defined. Whatever the type of vehicle may be—and it may be anything from a three-wheel van to a five-ton lorry—the applicant for a licence has merely to answer four questions regarding the state of his health and declare the answers to be true. The four questions (which appear on all driving licence forms) are well known:

1. Do you suffer from epilepsy or from sudden attacks of disabling giddiness or faintness?
2. Can you read at a distance of 25 yards in good daylight (with glasses if worn) a motor-car number plate containing six letters and figures?
3. Are you without either hand or foot or are you suffering from any defect in movement, control, or muscular power of either arm or leg?
4. Are you suffering from any other disease, mental or physical, or disability which would be likely to cause the driving by you of a motor-car to be a source of danger to the public?

Question 2 is checked by the examiners who conduct the official driving tests. They would presumably also notice so gross a defect as absence of a limb. Otherwise

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the physical competence of an applicant for a driving licence depends on his truthfulness, his knowledge of his own health, and the construction he puts on the phrase "likely . . . to be a source of danger." Medical men frequently experience difficulty in convincing patients that they are no longer fit to drive, and know that (if they choose) even persons who are obviously a danger to the public can ignore their advice.

At a meeting of the Royal Society of Medicine a doctor stated that one of his elderly patients "who drove a high-powered car at reckless speed" was extremely annoyed at the advice that he should give up driving after he had had three blackouts in one year and had been found to have developed petit mal (Crosby, 1953). On another occasion, a neurologist deplored the number of epileptic and paralytic patients who drive cars, and added, "The patient in every case considers himself entirely fit to drive" (Campbell, 1952).

Present Investigation

To amplify the evidence of these isolated instances the civilian medical board records of 1,276 men who earned their living as drivers of road vehicles were scrutinized. The records, which were compiled during the years 1941-4, were drawn from three areas† and referred to 761 lorry drivers, 406 drivers of vans or other light commercial vehicles, 31 drivers of public service vehicles, and a miscellaneous group of 78 chauffeurs, drivers of ambulances, and A.A. men.

TABLE I.—Professional Drivers of Road Vehicles

Reasons for Rejections	Lorries	Vans	P.S.V.	Other	Total
Eyes:					
High myopia . . .	3	4		1	8
Pathological defects . .	2				2
Ears:					
Defective hearing . . .	5	2			7
Pathological conditions . .	6				6
C.N.S.					
Epilepsy + unconsciousness . .	3	1		1	5
Neurological conditions . .		2			2
Mental defectiveness . .	4				4
Mental instability . .	3	3			6
Skeletal:					
Upper limbs . . .	3	3		1	7
Lower limbs . . .	12	9	2	4	27
Other skeletal defects . .	3	2		1	6
Cardiovascular:					
Heart disease . . .	11	4		1	16
Hyperpiesis . . .	2	2		3	7
Varicose veins . . .	7	2			9
Lungs:					
Tuberculosis . . .	5	10	1		16
Chronic chest conditions . .	6	5			11
Abdominal:					
Peptic ulcer . . .	10	9		1	20
Hernia . . .	7		1	1	9
Other . . .		1			1
General:					
Diabetes . . .	2			1	3
Other endocrine disorders . .		2			2
Skin conditions . . .	2				2
Other . . .	5	1		1	7
All disabilities . . .	101	62	4	16	183
No. of men examined . .	761	406	31	78	1,276
Rejection rate . . .	13%	15%	13%	20%	14%

Of these 1,276 men, 28% were under 20 years of age, 43% were between 20 and 34, and 28% were between 35 and 45. At the end of the medical examination each man was graded according to his general standard of fitness. Briefly these grades were: (1) fit for all forms of military service; (2) minor or remediable defects; (3) fit for light duties only; and (4) not fit for any form of military service. In practice men in Grades 1 and 2 were called up for national service, and men in Grades 3 and 4 were rejected. Ninety-nine of the professional drivers were placed in Medical Grade 4 and 83 in Medical Grade 3, making a total rejection rate of 14%. The main reason for down-grading was identified in every case, and the results are summarized in Table I.

†Essex, 577; Leicester, 273; Northampton, 426.