haemorrhage, a history of thromboembolic disease, coagulation disorders, or peptic ulceration. Twenty five patients, 11 of whom received heparin, chose general anaesthesia, and the remainder, 14 of whom received heparin, chose epidural blocks. Haemoglobin estimations and coagulation studies were carried out before operation and on days 1, 3, and 6 after operation. Operative blood loss was measured by washing all blood stained items collected at operation and for 24 h thereafter in 40 litres of cold water. The loss in the Redivac drain was included. The blood volume was calculated by proportion from the wash using the preoperative haemoglobin value.²

The mean blood loss was 712 ml in the saline group and 667 ml in the heparin group (table). This difference was not significant ($p>0.2$). The mean (SD) postoperative haemoglobin value was 112 (11.8) g/l in the saline group and 114 (11.9) g/l in the heparin group. The difference was not significant ($p>0.05$). Only two patients required a transfusion and both were in the saline group. Two patients, one from each group, showed abnormalities of plasma clotting factors. Twenty three, 11 from the heparin group, showed intermittent defects of platelet function. The blood loss of these patients, however, was not significantly different ($p>0.05$). Injections caused only minor discomfort and there were no serious wound haematomas. There were no cases of thromboembolism.

Amount of blood loss during caesarean section by 25 patients given saline and 25 given heparin

Blood loss (ml)	Saline	Heparin
<500	6	9
500-1000	16	13
1000-1500	2	1
1500-2000	1	2
Total	25	25

Comment

This study showed no significant difference in the blood loss at elective caesarean section or in the puerperium when heparin was administered. The mean loss of 689 ml was lower than that previously reported. Pritchard *et al* found a mean loss of 930 ml using radioactively labelled red blood cells to estimate blood volume changes after caesarean section.³ We accounted for all the actual blood lost. Nevertheless, six of our patients, three from each group, lost over 1000 ml. The greatest loss in the heparin group was 1874 ml, that in the saline group 1773 ml. In both these cases the operations were technically difficult. There were no coagulation abnormalities in these patients.

The effects of local anaesthetics on platelet function are well documented,⁴ but we found that the platelet abnormalities were evenly split between both general and local anaesthetic groups and there were no differences in blood loss between these two groups. Despite heparin treatment, there were no haematomas in the epidural group.

In the 1979-81 confidential inquiry into maternal deaths 28 deaths were caused by pulmonary embolism, which made this the second commonest cause of maternal death overall and the third most common in caesarean section.⁵ Fatal pulmonary embolism is 16 times more common after a caesarean section than after a vaginal delivery. We therefore advocate the use of heparin in elective caesarean sections in all patients, not just when risk factors for thromboembolism are identified.

We acknowledge the support of Leo Laboratories and the South East Thames Regional Health Authority (grant LORS No 77/19).

- 1 Kakkar VV. The current status of low dose heparin in the prophylaxis of thrombophlebitis and pulmonary embolism. *World J Surg* 1978;2:3-18.
- 2 Docherty PW, Goodman JDS, Hill JG, *et al*. The effect of low dose heparin on blood loss at abdominal hysterectomy. *Br J Obstet Gynaecol* 1983;90:759-63.
- 3 Pritchard JA, Baldwin RM, Dickey JC, Wiggins KM. Blood volume changes in pregnancy and the puerperium. *Am J Obstet Gynecol* 1962;84:1271-81.
- 4 Rao AK, Walsh PN. Acquired qualitative platelet disorders. *Clin Haematol* 1983;12:201-38.
- 5 Turnbull AC, Tindall VR, Robson G, *et al*. Confidential enquiries into maternal deaths 1979-81. London: HMSO, 1986:30-8.

(Accepted 8 February 1988)

Department of Obstetrics and Gynaecology, Pembury Hospital, Kent TN2 4QJ

NICHOLAS C W HILL, MRCOG, registrar
J GORDON HILL, FRCS, FRCOG, consultant gynaecologist.

Department of Haematology, Pembury Hospital, Kent TN2 4QJ

JEAN M SARGENT, BSC, research assistant
COLIN G TAYLOR, FRCPATH, consultant haematologist
PETER V BUSH, FIMLS, senior medical laboratory scientific officer

Correspondence to: Dr Taylor.

A nursing career for people with diabetes

Reports have suggested that students with diabetes may have problems in gaining acceptance for training by schools of nursing.^{1,2} To see whether there was any discrimination against applicants with diabetes the British Diabetic Association carried out a postal questionnaire survey in March 1987. This paper presents the results.

Methods and results

A complete list of schools of nursing was obtained from the hospital year book—that is, comprising 213 centres in Great Britain. Questionnaires were sent to the directors of nurse education at all centres. The questionnaire consisted of a general section and a medical section. The general section examined the number of applicants for nurse training and the criteria for selection. The medical questions concentrated on applicants with diabetes.

The initial mailing yielded a response from 144 centres, a second questionnaire sent two months later returned a further 41 replies, and a final letter yielded 17 replies. This gave a total response rate of 95%. Questionnaires were completed for only 186 centres; reasons for non-completion included being too busy, no longer trained nurses, and three schools stated that they considered everyone whether diabetic or not.

Centres were asked how many applicants were diabetic in the previous year, how many had been refused, and on what grounds. A total of 40 centres had had no applicants with diabetes and 68 schools did not know, the information being kept confidential or known only to the occupational health department. A total of 77 centres had had people with diabetes apply and 17 of these had refused applicants with the disease; half of these refusals were on medical grounds. Of those centres that had refused an applicant with diabetes in the previous year, five had experienced problems with diabetic students in the past and five considered that special provision was necessary, such as regular medical appointments and adjustments to shifts. If applicants were rejected on medical grounds over one third of schools stated that a second opinion could be obtained. Fourteen schools stated that if instability was the problem, the student could apply at a later date once stabilised. In the case of diabetes of recent onset delay in reapplying would be necessary until the diabetes was under control.

A report was obtained from the diabetic applicant's medical adviser in just under two thirds of centres and 26 centres required a report only in some cases—for example, when there was concern about stability or the medical history or there were complications.

Five centres stated that there were no factors which would lead them to refuse a diabetic person for nurse training whereas 113 of centres would refuse students with unstable disease or those with poor control of hypoglycaemic attacks. The table lists other reasons for refusing a diabetic applicant for training; more than one reason could be given for refusing a student.

Reasons for refusing an applicant with diabetes

	No (%) of centres
No reason to refuse	5 (3)
Unstable diabetes; poor control of hypoglycaemic attacks	113 (61)
Advice from occupational health department or consultant in charge	34 (18)
Severe complications	30 (16)
Unfavourable sickness record	19 (10)
Same as for other applicants (poor references, insufficient O levels, etc)	18 (10)
Insulin dependent diabetes of recent onset	13 (7)
Lack of responsible attitude to diabetes	8 (4)
Shifts/diet	4 (2)
Diabetic problems in adolescence	3 (2)
Other health problems	2 (1)
Overweight	2 (1)

All centres expected trainees with diabetes to undertake every aspect of training but 60 considered that they needed to make some special provision, which included arrangements to allow attendance at medical appointments (31), adjustment or advice on shifts (13), or provision of extra support within the department (17). One centre would not allow time off for medical appointments, as it considered that these could be fitted in off duty time.

There had been problems with diabetic students in the past in 50 schools. Though minor hypoglycaemic attacks were mentioned in 11 schools, they were not thought to be a serious problem. Inability to cope with diabetes was mentioned in five, unfavourable health record in nine, inability to cope with shifts in nine, problems with complications in four, and four reported problems not due to diabetes but related to the age group, alcohol consumption, and drug consumption. Information was regarded as confidential in seven cases.

Comment

In view of the good response rate achieved we consider that this study represented the views of nearly all the nurse training centres in the United Kingdom. No school of nursing appeared to be overtly discriminatory

against diabetic applicants and it appears that suitably qualified people with stable diabetes are now able to train as nurses.

1 Bagshaw E. Careers for diabetic girls in nursing. *Br Med J* 1980;280:1227.

2 Foster T. Nursing ambition. *Balance* 1985 Oct:27.

(Accepted 4 March 1988)

Charing Cross and Westminster Medical School, London SW1P 2AR

NICOLA ROBINSON, PHD, lecturer in community medicine

JOHN LISTER, FRCP, consultant physician

Employment Working Party, British Diabetic Association, London W1M 0BD

SUSAN KNIBBS, CQSW, head of services division

Correspondence and requests for reprints to: Dr Robinson.

Activated charcoal, emesis, and gastric lavage in aspirin overdose

It is common practice to try to prevent intestinal absorption of ingested poisons. Controversy continues about the relative effectiveness of charcoal, ipecacuanha, and lavage in salicylate overdose,¹ but no study has yet compared all three methods. This study of simulated aspirin overdose in volunteers aimed to compare the effectiveness of gastric lavage, emesis induced by ipecacuanha, and activated charcoal. We also compared how easily these procedures could be performed in a busy accident and emergency department and their effects on the volunteers.

Subjects, methods, and results

Twelve healthy volunteers aged 21-34 attended at weekly intervals. They fasted overnight, voided, and took 1.5 g aspirin (20×75 mg tablets) with 200 ml tap water. After 60 minutes each was randomly assigned to one of four regimens: control (no further treatment); ipecacuanha (30 ml syrup of ipecacuanha with 200 ml water, repeated if emesis did not occur within 30 minutes); charcoal (50 g activated charcoal (Carbomix, Penn) in 400 ml water); and gastric lavage (performed with a 30 French gauge orogastric tube, using 3 litres of tap water in 300 ml aliquots and allowing the stomach to empty under gravity between aliquots). Subjects were monitored by electrocardiography, and urine was collected for 24 hours after aspirin was given. The time taken, effects on subjects, and cost of each procedure were recorded. After hydrolysis concentrations of salicylate were measured in urine by Trinder's method. The table gives the results.

Comment

Activated charcoal has been shown to be more effective than ipecacuanha in simulated salicylate poisoning,² but in our study the three treatments had

almost equal effects on recovery of salicylate from urine. Animal studies have shown the efficacy of charcoal in adsorbing aspirin and that charcoal and gastric lavage combined might be more effective than charcoal alone.³ In our study the ratio of charcoal to aspirin was higher than the ratio of charcoal to drug of 10:1 recommended for the treatment of acute poisoning, but the absorption of soluble aspirin may have been too rapid to show any superior effectiveness of charcoal. Comparing treatments less than one hour after overdose, however, would have had less clinical relevance.

Lavage took considerable time, although the nurses were experienced and the volunteers cooperative. Two nurses were used for safety and comfort; with difficult patients a third is sometimes needed. As lavage may have to be scheduled when the workload permits, delays could pose problems with drugs that are rapidly absorbed or when the conscious level may deteriorate quickly. Gastric lavage produced transient discomfort related either to insertion of the tube or to its position against the pharynx but was well accepted. No after effects were reported. Ipecacuanha produced emesis in all subjects, but all reported nausea and fatigue lasting several hours after a single dose. These symptoms were not related to inappropriate dosage, repeated doses, failure of ipecacuanha to induce vomiting, or vomiting on an empty stomach (water was given with the ipecacuanha). Protracted malaise or nausea after ipecacuanha might be incorrectly ascribed to the effects of the toxic substance ingested. Activated charcoal was easily prepared. No volunteer took more than 10 minutes to drink it, and no after effects were observed or reported. Supervision by a nurse was not required after its administration.

When several treatments are equally effective it seems sensible to choose the one that is most convenient to administer, least invasive, and potentially least harmful to the patient. The costs of all three treatments are fairly low and should not influence decisions on treatment. From our observations charcoal was easiest to administer, had fewest side effects, and was preferred by most volunteers. Given in repeated doses, it may have the added advantage of shortening the elimination half time of salicylate,⁴ and this has been recommended but remains unconfirmed in large overdoses.⁵

1 Arena JM. Aspirin poisoning—gastric lavage, ipecac, or activated charcoal? *JAMA* 1970;212:327-8.

2 Curtis RA, Barone J, Giacona N. Efficacy of ipecac and adsorption in a simulated overdose. *Arch Intern Med* 1984;144:48-52.

3 Burton BT, Bayer MJ, Barron L, Aitchison JP. Comparison of activated charcoal and gastric lavage in the prevention of aspirin absorption. *J Emerg Med* 1984;1:411-6.

4 Hillman RJ, Prescott LF. Treatment of salicylate poisoning with repeated oral charcoal. *Br Med J* 1985;291:1472.

5 McGuigan MA. Death due to salicylate poisoning in Ontario. *Can Med Assoc J* 1986;135:891-4.

(Accepted 23 November 1987)

National Poisons Unit, Guy's Hospital, London SE1 9RT

V DANIEL, MD, research fellow

J A HENRY, MB, FRCP, consultant physician

Accident and Emergency Department, King's College Hospital, London SE5 9RS

E GLUCKSMAN, MD, FRCP, consultant

Correspondence to: Dr J A Henry, National Poisons Unit, New Cross Hospital, London SE14 5ER.

Results of treating aspirin overdose in 12 volunteers

	Control	Emesis	Gastric lavage	Charcoal
Mean (SD) recovery of salicylate (%) [*]	60.3 (13.3) [†]	55.6 (10.0)	55.5 (8.8)	52.5 (7.0)
Mean (SD) time taken for procedure (min)		16 (5) To first emesis 23 (5) Duration [‡]	Preparation 12.5 (4.4) Procedure 12.0 (3.1) Cleaning up 8-10	10 (Maximum)
Mean (SD) amount recovered (ml)		303 (62) Emesis	2755 (134) Fluid	
Cost of treatment per volunteer		50p Per 30 ml dose	£7.50	£7.80
Volunteers' responses		Discomfort of vomiting; nausea and malaise for 3-6 hours in all volunteers	Discomfort during procedure; no electrocardiographic abnormalities; no after effects	No adverse effects; no vomiting

^{*}Urine volumes were not significantly different between groups.

[†]p<0.025 Compared with treatment groups.

[‡]Mean (SD) number of episodes of emesis was 3.1 (1.3).