‘Pushing fluids’ – Can current practices of maintaining hydration in hospital patients be improved?

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Dehydration leads to syndromes caused by volume contraction and the changes in osmoregulation resulting from varying proportions of salt and water deficits [1]. It is the commonest cause of fluid and electrolyte disturbance in older patients [2]. Osmoregulation is achieved mainly by changes in water balance with osmoreceptors influencing ADH secretion and thirst. Volume regulation is achieved mainly by changes in sodium balance that are sensed by multiple receptors which activate effectors, including aldosterone [3].

The clinical signs of dehydration, particularly in older patients, are known to be misleading [4]. The classic signs of dry tongue and mucous membranes are simulated by mouth breathing, and the loss of skin tone, being a normal feature of ageing, becomes unreliable in older patients. Furthermore, in younger patients, dehydration may be well advanced before clinical signs are recognised. Skin changes may not be apparent until fluid deficits reach 4-5 per cent of total body weight and the circulatory changes of a falling blood pressure, tachycardia and peripheral vasoconstriction appear with losses of 6-7 per cent of body weight. Severe neurological disturbance and death may occur when the deficit rises towards 10 per cent of body weight [5]. Older patients are less likely to complain of thirst [6] and yet are more prone to dehydration, because of impaired urine concentrating ability [7] and a lack of thirst response to a falling serum osmolality [8]. Increasing blood viscosity leads to increased susceptibility to venous and arterial thrombus formation. Bronchial secretions become more viscid, thus increasing the risk of chest infection. Pressure sores and postural hypotension are more likely in older patients with consequent delays in mobilisation and discharge. There may be impaired renal excretion of drugs such as digoxin leading to toxicity.

Factors predisposing to dehydration include disturbed sensorium, all forms of serious illness, surgery, sedation and inappropriate use of diuretics [9,10]. Hamdy [11] reported a survey of 2,000 elderly hospital patients in which 37.4 per cent were receiving diuretics.

The criteria for administering any form of assisted fluids are often vague and ill-defined. They are more likely to be based on nursing or ward medical staff observing that 'she looks a bit dry—better push fluids', than on objective evidence.

Intravenous lines are not without hazard [12,13] and are often placed because of a failure of non-invasive methods of hydration, and frequently because of the high demands the latter make on nursing time. Nasogastric tubes, particularly broad bore ones, are disliked by both nursing staff and patients.

We have carried out a survey to quantify and classify the methods of hydration currently in use in Liverpool Hospitals.

Methods

A one-day census was carried out on 927 patients in 38 hospital wards in Walton and Fazakerley Hospitals, Liverpool, and the Royal Liverpool Hospital (Table 1). Every medical ward in the three hospitals was included comprising a total of 407 patients. We included three general surgical wards containing 82 patients and four specialist surgical wards (female orthopaedic, mixed orthopaedic, adult ENT and gynaecology) containing 95

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patients. We also included five acute geriatric wards (133 patients), six continuing care wards (167 patients) and an acute medical rehabilitation unit containing mainly stroke patients (43). Senior nursing staff on each ward were questioned by one of the five participants in the study, and asked to indicate the methods of hydration in use for every patient on the ward.

A patient was included in a particular category if he was on any specific mode of hydration at any time during the 24-hour period of the census day. Patients on assisted fluids were divided into two major categories of invasive and non-invasive methods. The invasive group was subdivided into intravenous and nasogastric, the latter being further divided into administration by fine-bore tube (10 fg or less) or broad-bore tube (12 fg or greater).

The non-invasive group was divided into patients requiring physical help from nurses in a second group who took fluids without physical help but required prompting or 'pushing'. Physical help was defined as a nurse assisting a patient to hold or drink from any form of feeding device. If a patient was on more than one method simultaneously then only the method highest in our classification was scored.

Results

A total of 36.3 per cent of all patients were found to be receiving assisted fluids; 7.8 per cent of all patients were in the invasive group with intravenous fluids far outweighing nasogastric fluids (1.9 per cent). The ratio of broad-bore to fine-bore tubes was 11:7. Of all patients, 28.5 per cent fell into the non-invasive group with the prompting and pushing sub-group (15.3 per cent) outnumbering patients receiving physical help (13.2 per cent). No patients in this survey were receiving subcutaneous fluids.

The mean age of all patients in the general medical wards was 63.5 years. The mean age of patients receiving physical help to take fluids was 69.9 years and of those requiring prompting and pushing 72.4 years (Table 2).

Discussion

Although all hospital clinicians are aware of the problems of rehydrating and maintaining rehydration, there are no previous reports of a quantitative survey. We have introduced a simple new classification for patients who are not taking fluids independently, separating these according to invasive and non-invasive methods of giving fluids, and drawing attention to the size of this group (24.6 per cent) within the survey.

Nursing implications

It is an ideal to have nurses able to spend long periods administering fluids to a single patient but the demands on nursing time make this impractical. The reduced thirst drive in older patients puts a great responsibility on nursing staff to recognise early dehydration. There is a trend towards devolving the administration of both food and fluids to non-nursing staff with detrimental consequences to the patient. Failure to maintain adequate oral hydration results in some patients undergoing the discomfort and hazards of intravenous lines or nasogastric tubes. Policies of early mobilisation frequently mean that an ill patient is sat in a low chair and unable to reach fluids placed on a high bedside locker. The motor weakness following a stroke is obvious, but cognitive dysfunction is equally disabling and much less easily recognised.

Feeding devices

Older patients, particularly with poor respiratory reserve, frequently cannot cope with straws or simply dislike them. Nursery style cups and feeders are usually far from dignified and often not welcomed by patients. We suggest there is a need to look at new methods of administering oral fluids that are less consuming of nursing time and are more acceptable to patients.
Fluids

Fresh hot tea is liked, stale tepid tea is not. Lucozade is commonly provided by well-meaning relatives but its high sugar content often provokes nausea in older patients and is inappropriate for those with glucose intolerance. Fizzy drinks are often not appreciated by the older generation.

Diagnostic problems in assessing hydration

The great difficulties in the clinical assessment of hydration, particularly in mild to moderate dehydration, suggest the need for a swift, reliable, and preferably cheap method of objective assessment suitable for routine ward use. We want to know at an early stage when a patient is beginning to dehydrate and we need to be able to easily, quickly and rapidly monitor the effects of any method of rehydration.

Should greater use be made of biochemical tests? The rising serum urea with a normal or near normal serum creatinine is useful but often somewhat retrospective. Perhaps greater use should be made of spot urine and serum osmolalities on general wards (almost unused in this survey). Several estimations will often be required in a 24-hour period which implies a very rapid laboratory service. Many intensive care and renal units have on-site osmometry. There is increasing interest in rapid biochemical bedside testing in the light of improving technology [14]. The availability of routine rapid blood sugar measurement by immediate strip analysis has rationalised the routine ward management of hyperglycaemia. Assessing hydration has many metabolic parallels.

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Observations

William Heberden, that great 18th century physician, has a secure niche in the profession’s hall of fame. His son, also William, is not so well known. He was a physician who profited from his father’s social connections, but also took a great interest in the geographic and climatic variations in disease. He noted that ‘of those aged above sixty years by much the greatest number die in the coldest months and the fewest in the middle of summer.’ He attributed this to the degree of cold as ‘universally old people above all others are most sensibly affected by it.’ He contrasted this phenomenon in England with the excess of deaths in the summer months in Marseille, considering that the stench of the galley slaves might have something to do with it. Ranging over a wider time scale he reflected on the epidemics of plague, remarking that ‘each country is unwilling to acknowledge herself the parent of such an odious offspring. From this part of Europe we are taught to look to Turkey for the source of this evil.’ Of course, he considered it ‘odious to assert that Plague was bred in London.’

The rising birth rate towards the end of the 18th century attracted Heberden’s attention. He thought that it might be due to ‘the warmer clothing and better fare which the poor now enjoy.’ But he wondered whether that was the whole story. ‘A physician of the first rank in his profession has suggested to me that tea may be considered a powerful aphrodisiac; and he imputes the amazing population of China, amongst other causes, to the general use of it. But the Dutch who drink large quantities of the infusion of this vegetable are so far from being remarkable that I have been well informed that two births to a marriage is the common population in Holland.’

Whatever he drank, Heberden fathered nine children. His wife died in 1812 and he brought up his large family himself. In 1829 a daughter and a son died. Heberden then ceased to practise and devoted himself to the study of theology.