heart rate or even bradycardia can be associated with an acute reduction in blood volume.⁷ A retrospective study of patients with isolated extremity trauma or isolated penetrating abdominal trauma found that of the 71 patients presenting with systolic blood pressure of less than 100 mm Hg, 25 (35%) had a pulse rate of fewer than 100 beats/min.⁸ A retrospective study of patients at a trauma centre found that of 750 patients who presented with a systolic blood pressure of less than 90 mm Hg, 217 (28.9%) had a pulse rate of fewer than 90 beats/min.⁹ The authors of the study also suggested that bradycardia was associated with a better prognosis in certain subgroups of patients.

In the face of severe hypovolaemia, the bradycardia seen in the second phase of cardiovascular response to acute haemorrhage allows for a longer time for diastolic ventricular filling leading to an increased stroke volume.¹⁰ This bradycardia may result from the activation of a vagally mediated reflex arc originating from mechanoreceptors in the left ventricle.¹¹ The bradycardic response may also be the result of a parasympathetic reflex mediated via the vagus nerve triggered by blood in the peritoneum.¹² Vagus involvement is suggested by the fact that after cooling or cutting of the vagus nerves after rapid external haemorrhage in cats the fall in blood pressure was not affected, but the bradycardic response was absent.¹⁰ Why some patients do not show initial tachycardia is unknown.

Conclusion

Bradycardia in patients presenting with acute haemorrhage is common, either as part of a normal physiological response or as a relative bradycardia. The

assumption that initial tachycardia is the only haemodynamic response to acute central hypovolaemia is incorrect, and a failure to recognise bradycardia as a sign of acute haemorrhage is potentially dangerous. Increasing circulatory volume in these critically ill patients should not be delayed.

Contributors: IT and JD collected the data. IT wrote the paper. JD reviewed and redrafted the paper. JD is guarantor.

Funding: No additional funding.

Competing interests: None declared.

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(Accepted 23 July 2003)

A memorable patient

Happiness is ...

It has been observed in these pages that having a parent's health problem referred to a geriatrician is nature's way of telling you to grow up. The call to the psychogeriatrician is often the signal that a cherished relationship has undergone an irrevocable change and that a new order has taken its place as the prelude to an unwelcome full independence.

And so one day the time came to admit that my father's forgetfulness, irrational behaviour, and wandering were no longer just subjects for resigned family humour but were becoming a hazard to him and a nuisance to the local community. Thus, he and I came to sit in the psychogeriatrician's office—all very friendly, with me probably more nervous than anybody. The initial orientation challenges established the severity of Dad's problems—a receptive and expressive dysphasia behind which it was difficult to imagine a functioning intellect. There was a pause (was there any point continuing?), and then a little "comprehension" exercise: "What is happiness?"

Was this fair on a man in such a condition? I sometimes wonder if it wasn't just a gambit in the hope of passing a few minutes that loomed empty, since it's a question that I suspect would have many of us scrabbling for a useful response.

And what have other, working minds contributed? My *Concise Oxford Dictionary* has "happiness" merely as the noun associated with the word "happy," whose own entry seems to consist of synonyms: "lucky, fortunate, contented with one's lot." Those who

work with words have fitted the concept with diverse associations. Here are a few examples: something the pursuit of which is "an inalienable right of man" (Thomas Jefferson, *American Declaration of Independence*); that which when recalled leads to the greatest misery (Dante); the result of an annual income of twenty pounds with expenditure of nineteen pounds nineteen shillings and sixpence (Charles Dickens, *Pickwick Papers*); or simply the effect of "a good bank balance, a good cook, and a good appetite" (Thoreau).

Perhaps a waste of time, then, asking an old man who can't tell you what day of the week it is. But an answer came. "Happiness is a thing, like this," a wave of the hands. "You lose some and then you get some back." And that was that. The rest of the consultation was brief, and the offer of care at a day centre no surprise and, sadly, little help.

But my father's answer has stayed with me. Was it actually worth anything? Was it just random gibberish from an ischaemic temporoparietal zone? Or a final *haiku* from an old man withdrawing from the world, illustrated not with a calligrapher's flourish but with a hand jive? Whatever, he lived another nine months, and it stands as the last (possibly) sensible thing he said. I have always found it useful as a piece of philosophical advice, and I thought I'd share it with you.

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