It's 9 a.m. on a Saturday morning and I'm on call for neurosurgery (Figure 1).

The junior in the team is a locum who started yesterday and has no experience in neurosurgery!

Already there have been three referral calls with urgent problems. A patient with cauda equina syndrome admitted early this morning is due to undergo an emergency operation. I am eager to do the operation but because of my limited experience the on-call consultant has kindly agreed to come in and assist me.

A patient who had a craniotomy yesterday is unwell on the ward. I really need to fit in a ward round to assess her and, in addition, to ensure all is well with the other patients.

I also need to speak to a relative who is upset because his mother's operation for a chronic subdural haematoma was cancelled yesterday because of another emergency.

I need to find a source on spontaneous intracerebral haemorrhage for the tutorial I am presenting on Monday if time allows, which right now seems unlikely.

And I had no time to prepare my usual packed lunch today!

Figure 1 On-call trainee at work not adequately prepared for the challenges (with kind permission of Dr Chandru Kaliaperumal).

1 Introduction to On-Call Neurosurgery

It is estimated that 50 per cent or more of the caseload in neurosurgery relates to emergency and urgent conditions [1]. The mechanism by which most departments cater for this is the 'on-call service'. What constitutes the on-call service naturally varies by country, health-care system and individual department. In most settings, it involves a dedicated clinician or team of clinicians in training ('registrars' or 'residents', depending on the system), under the supervision of a qualified specialist

('consultant' or 'attending' neurosurgeon), specifically delegated the responsibility of dealing with emergency and urgent work. Within such a team, members may take on different roles. For example, a junior trainee (Postgraduate Year (PGY) 1/2 in the USA or Specialist Trainee (ST) 1/2 in the UK) may primarily manage ward-based care of inpatients, while one or more senior trainees (PGY3+ or ST3+) take responsibility for new referrals, emergency admissions and emergency operations. In reality, the 'team' also includes a wider group of clinical and other professionals such as anaesthetists, intensivists, radiologists, theatre nurses and so on.

How the on-call service functions, even within a department, can differ depending on the day of the week and time of day. For example, the on-call team may face additional responsibilities outside of 'normal working hours' (i.e., during evenings, nights and weekends) as they are the only available clinicians for all the medical needs of the department including the care of ward or 'floor' patients. In contrast, during weekdays, other colleagues are present to deal with work other than that arising from new referrals and admissions.

Being on call is often regarded as one of the most challenging parts of training in neurosurgery. The days are usually long (12 or sometimes 24 hours) and the pressure continuous. The workload is considerable, and the cases encountered are varied and include life-threatening conditions requiring both a broad knowledge of the specialty as well as an ability to triage quickly the serious from the trivial. Stress is compounded by the high stakes which mean that wrong decisions or delays can have serious consequences.

Much of the burden of the on call is in being the first point of contact for referral or discussion of urgent and emergency conditions, usually via the dreaded 'bleep', pager, on-call telephone or more novel electronic referral systems (see Grundy, Joannides and Ray, *Sources, Modes and Triage of Emergency Referrals to Neurosurgery*, Elements in Emergency Neurosurgery, Cambridge University Press, forthcoming). The on-call surgeon in a busy department may therefore have very many interactions with referring teams – via telephone, electronic message or in person – throughout a working day. In the authors' departments this typically amounts to as many as 100 interactions in a 24-hour period. This continuous state of being 'in-demand' is the source of much human frustration for referring colleagues who can spend a great deal of time trying to make contact during busy periods – frustration which can be directed back at the on-call neurosurgeon.

Despite the challenges, the on call is uniquely educational, and the rewards can be huge – for example, in the many cases where timely action and intervention is life-saving. The job involves many competing responsibilities, an important selection of which are summarised in Box 1.

Box 1 Responsibilities of the on-call trainee/team

Clinical

- Referrals (internally, and from a network of referring hospitals)
- Admissions
- Ward rounds
- Unwell or deteriorating inpatients
- Emergency operations
- Contemporaneous documentation

Administration

- Bed prioritisation/patient flow
- Booking urgent operations on theatre lists

Team-related

- Training of junior colleagues
- Supporting junior/nursing/critical care colleagues
- Discussion with senior colleagues

Personal

- Nutrition and hydration
- Attending to bodily functions
- Dealing with stressful or upsetting situations
- Maintaining own physical and mental health

Communication

- With consultant (now versus at a convenient time)
- With referring teams
- With colleagues
- With patients and relatives (including breaking bad news)
- Consenting for procedures
- Updating handover documentation

The challenge of on-call neurosurgery is to juggle these demands in such a way as to maximise the quality of care delivered to patients within the constraints of limited time and resources. Yet the job is also unmistakably human, and so compassion towards patients and relatives, as well as respect for colleagues in often stressful and difficult circumstances, is paramount. In addition to all the