

Supplementary information S1 (box)

Notable recent cases of vegetative state

Tony Bland (UK)

Prior to Tony Bland, the non-treatment of any patient was restricted to new-born babies in the UK. Tony Bland suffered a severe hypoxic brain injury in the 15th April 1989 Hillsborough football stadium disaster. He was transferred to Airedale NHS Trust where doctors found no evidence of awareness of self or environment. A computed tomography (CT) scan revealed an intact brainstem, but extensive cortical substance loss. In August 1989, the doctor in charge of Tony Bland's care contacted the local coroner to inform him of the intention to withdraw nutrition and hydration. This decision had been taken in full consultation with the family and was in accordance with their wishes. The coroner replied that he had no jurisdiction over a living being and the doctor would face charges of manslaughter if he withdrew treatment. The following day, the doctor was visited by the police and advised to take legal counsel. Airedale NHS Trust with the support of Tony Bland's family then made an application to court to withdraw life-prolonging treatment^{1,2}. As Tony Bland was unable to speak for himself, the official solicitor was assigned as his guardian *ad litem*. The official solicitor opposed the Airedale NHS Trust application and the case subsequently went to appeal. Several expert witnesses including Bryan Jennett and Fred Plum (who coined the term vegetative state³) were called to give evidence. All witnesses suggested that Tony Bland had very little chance of further recovery, nor the opportunity for any quality of life. Legal approval for withdrawal of nutrition and hydration was subsequently approved and Tony Bland died on the 3rd March 1993.

This is a particularly interesting case because it predates the publication of guidance notes on the management and diagnosis of the vegetative state first published by the Royal College of Physicians in 1996 and updated in 2003 and the detailed description of the medical aspects of the persistent vegetative state published by the USA Multi-Society Task force in 1994^{4,5}. In these guidelines, the threshold for poor prognosis was set at 6 months post non-traumatic brain injury in the UK and guidelines for the diagnostic process to exclude any possibility of further recovery were proposed. Although the legal request to withdraw treatment from Tony Bland was made before this 6-month threshold, it is unlikely, based on the evidence presented in court, that a

different decision would have been made subsequently. However, following the publication of these guidelines, the process would have been started later following the injury and thus, greater time would have been allowed to assess whether any spontaneous recovery had occurred.

Terri Schiavo (USA)

The case of Terri Schiavo became the subject of intense public and political debate around the world in 2005. Terri Schiavo suffered severe hypoxic brain damage in February 1990 and had resided for 15 years in a palliative care setting. Throughout the 1990s her husband and parents coordinated rehabilitation efforts, including regular physiotherapy, occupational therapy and speech therapy. In 1998 her husband (assigned next of kin) petitioned the local Florida court for withdrawal of nutrition and hydration based on his wife's premorbid wishes. This move was opposed by her parents, who argued that Ms Schiavo was aware of herself and of the environment. The court initially approved withdrawal of nutrition and hydration, but the proceedings continued for seven years with the eventual involvement of politicians, advocacy, pro-life and disability rights groups. Before the local courts ruling was finally carried out in March 2005, the governments of Florida and the United States of America had attempted to pass, unsuccessfully, laws to prevent withdrawal of nutrition and hydration.

Would fMRI have altered the court decision in the Schiavo case? The answer is very likely to be no, given the nature of her brain injury and the lengthy duration of her vegetative state (see main text). To date, no patient beyond the critical thresholds for decisions regarding permanence has shown evidence of awareness using brain imaging in the absence of behavioural markers. In any event, in Terri Schiavo's particular case, the presence of a right posterior thalamic deep brain stimulation electrode placed in 1990 (see Box 4), would have prevented her involvement in any subsequent fMRI study.

1. Airedale NHS Trust versus Bland. *Swarb.co.uk* [online] http://www.swarb.co.uk/c/hl/1993airedale_bland.html (1993).
2. Oates, L. The courts' role in decisions about medical treatment. *BMJ* **321**, 1282–1284 (2000).
3. Jennett, B. & Plum, F. Persistent vegetative state after brain damage. A syndrome in search of a name. *Lancet* **1**, 734–737 (1972).
4. The Multi-Society Task Force on the Persistent Vegetative State. Medical aspects of a persistent vegetative state. *N. Engl. J. Med.* **330**, 499–508, 572–579 (1994).
5. Royal College of Physicians. *The Vegetative State: Guidance on Diagnosis and Management* (Royal College of Physicians, London, 1996).