their becoming mentally incapacitated. It is extraordinary how relatively few people in Britain have taken up the idea even though the first living will was written in the US in the 1930s. This will ensure that the final decision is a personal one, taken without manipulation or coercion.[8] Clearly views for and against euthanasia are strongly held, and as with other emotive issues like abortion and animal experimentation, it is unlikely there will ever be a consensus. The wishes of those who find the idea of assisted dying morally repugnant should of course be respected, but why should they override individuals and helpers who believe in a gentle and easy death?

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lesson of the month

Serotonin syndrome secondary to fluoxetine precipitated by radiation induced cerebral vasculopathy

Serotonin syndrome is a predictable consequence of excess serotonergic agonism of the central nervous system receptors as well as peripheral serotonergic receptors.[1] The clinical manifestations of the syndrome range from barely noticeable to fatal features. In serotonin synthesis, ingested tryptophan crosses the blood–brain barrier and enters neurones where it is hydrolysed and decarboxylated to serotonin. The serotonin is stored in vesicles and released into the synaptic cleft with resultant depolarisation of the presynaptic neurones.[2,3] Removal of serotonin from the cleft is via reuptake pumps and it is either repackaged or degraded by monoamine oxidase (MAO). Monoamine oxidase has two isoforms: MAO-A which metabolises serotonin, and MAO-B which metabolises catecholamines.[4] Theoretically, damage to vascular endothelium is associated with a decrease in MAO-A activity, hence a reduction in the capacity to metabolise serotonin with a resultant increase in levels of serotonin. This lesson reports the case of serotonin syndrome in a 71-year-old man secondary to fluoxetine believed to be precipitated by radiation-induced vasculopathy.

Lesson

A 71-year-old man was admitted in September 2006 with a one-week history of increased confusion, unsteadiness of gait, and stiffness and tremors involving all limbs. Five weeks before admission he developed jerking of hands followed a few days later by stammering, staggering gait and generalised shaking of the body while at rest. He progressed to confusion and agitation. He had no fever, headache, vomiting or weakness. Past medical history included: tonsillar carcinoma for which he had received radiotherapy to the left tonsil during February and March 2006; prostate cancer; depression; spinal stenosis (diagnosed in September 2003); and a monoclonal gammopathy of unspecified significance. For over a year his regular medications were: fluoxetine 20 mg once a day, amitriptylline 10 mg once a day, fentanyl 50 mcg/hour, simvastatin 20 mg and allopurinol 300 mg once a day. There had been no changes in his regular medications and he gave no history of taking over-the-counter cough syrups. Clinically he was afebrile, blood pressure 160/90 mmHg, heart rate 80 bpm and his Glasgow Coma Scale was 14/15 (confused speech). General examination was normal.

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Table. List of investigations and results.

Computed tomography scan ± contrast	Unremarkable (no metasteses)
Cerebrospinal fluid	Clear and colourless Cell count: lymph <1, polys <1, red blood cells 5, monocytes 1 Normal biochemistry Herpes simplex and varicella zoster polymerase chain reaction: negative Culture: no growth Cytology: no malignant cells Cryptococcal antigen: negative
Magnetic resonance image (multiple sclerosis protocol, pre- and post-gadolinium)	Scattered white matter hyperintensities seen against a background of dilatation of the virchow-robin spaces and cerebral atrophy. The conclusion was that this may represent microvascular disease. There were no specific features to suggest vasculitis
Serum neuronal autoantibodies	Hu neuronal Abs titre – negative Yo neuronal Abs titre – negative Ri neuronal Abs titre – negative
Chest X-ray	Normal
Full blood count	White cell count 14.3 Haemoglobin 11.5 Platelets 110 Mean corpuscular volume 94.0
C-reactive protein	21
Urea and electrolytes	Normal

Neurologically he was hypertonic in all limbs with globally brisk reflexes and clonus, power was 5/5 in all muscle groups. Cranial nerves were normal, no neck stiffness and Kernig's sign was negative. A day after admission he developed status epilepticus and required two-day admission to the high dependency unit. Initial differential diagnoses were tonsillar carcinoma with brain metasteses, paraneoplastic syndrome, encephalitis/meningitis, cerebral vasculitis, radiation vasculopathy with diffuse ischeamia, and side effects from drugs.

The patient deteriorated despite initial treatment for bacterial meningitis and viral encephalitis. Having ruled out infection, malignancy, vasculitis and other possible intracranial pathologies, serotonin syndrome secondary to fluoxetine was considered. The fluoxetine was therefore gradually stopped and the symptoms resolved within 48 hours. The patient was safely discharged three days later and has been symptom free since discharge.

Discussion

Serotonin syndrome is potentially fatal and so it is important to be aware of this syndrome in individuals with unexplained neurological symptoms and signs on drugs which act upon the serotonin system. Between 12 to 16 weeks before admission, the patient had received radiotherapy for tonsillar carcinoma and it was possible that radiation had spread to the brain causing a vasculopathy.[5] No new drugs were introduced and the levels of current medication remained the same. Therefore, this case is a cerebral vasculopathy with subsequent damage to the vascular endothelium resulting in possible decreased levels of MAO-A isoform activity and a reduced metabolism of serotonin. As far as we are aware, this is the first reported case.

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