SAMJ FORUM

CASE REPORT

A case of dura mater graft-associated Creutzfeldt-Jakob disease in South Africa

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We report Africa's first known graft-associated case of Creutzfeldt-Jakob disease (CJD), and compare it with other published cases. The patient presented 11 years postoperatively with ataxia, dysarthria, and cognitive impairment. Magnetic resonance imaging (MRI) (without diffusion weighting) and early electroencephalogram (EEG) were nonspecific, but triphasic waves appeared later, when cerebrospinal fluid (CSF) was positive for protein 14-3-3. Periodic synchronous discharges (PSDs) appeared 14 weeks before death. Delayed PSD may be a grave sign that forebodes death.

CJD belongs to a group of neurodegenerative disorders known as prion diseases. In these conditions an abnormal isoform of the prion protein (PrP) may develop: (*i*) sporadically; (*ii*) through genetic mutations in the prion protein gene (familial CJD); or (*iii*) through infection, as in new-variant and iatrogenic CJD. Cadaver-derived human dura mater grafts from infected but asymptomatic donors can cause CJD in the implanted host.

Case report

A 27-year-old South African man underwent correction of an Arnold-Chiari malformation and syringomyelia in 1991. The patient remained well until he presented on 8 March 2002 with a 12-week history of truncal ataxia and subjective cognitive impairment. Examination revealed cerebellar abnormalities only, with truncal ataxia and dysarthria prominent. Baseline investigations including a lumbar puncture and 3 MRIs (including contrast) were normal; diffusion-weighted MRI was unavailable at the time of presentation. An EEG revealed diffuse background slowing only.

A trial of empirical methylprednisolone, 500 mg daily for 5 days, proved ineffective and the patient continued to deteriorate. He developed severe cerebellar and upper motor neuron signs, diffuse myoclonus, and clinically evident signs of cognitive impairment. A second EEG showed background slowing and triphasic waves, suggesting CJD.

A third EEG on 11 April 2002 exhibited a typical CJD pattern with diffuse background slowing, combined theta and delta waves and PSDs. Cerebrospinal fluid was positive for protein 14-3-3. It was only at this stage that we learnt the patient had received a commercially available lyophilised dura mater graft (Lyodura, B Braun Meslungen AG, Meslungen, Germany) during surgery for his Arnold-Chiari malformation. A presumptive diagnosis of dura graft-associated CJD was made. There was no family history of CJD.

At clinical review on 12 May 2002 severe deterioration was noted, with complete anarthria, tremor, myoclonus, and severe ataxia. The patient progressed through akinetic mutism and coma to death on 23 July 2002.

Autopsy demonstrated spongiform cerebral and cerebellar cortical degeneration. Histolopathological examination in Cape Town revealed patchy cortical vacuolation, neuronal loss, and astrocytosis, which was most intense in the deeper layers. The cerebellum exhibited severe granular cell loss and astrocytosis, with molecular layer avacuolar shrinkage and cellularity evident. Purkinje cells were preserved, and plaques were not seen with routine staining. Cortical immunostaining by the Paris Reference Laboratory confirmed prion type I and the diagnosis of probable dural graft-associated CJD.

Discussion

Our patient exhibited both typical and unusual features. Brown *et al*.[1] reported presenting symptom frequencies in 5 CJD cases following infratentorial and cervical grafting as follows: cerebellar (*N* = 3); mental (*N* = 1); visual (*N* = 2). In a series of 57 Japanese patients Hoshi *et al*.[2] recorded presenting symptom incidences as follows: cerebellar 56.1%, memory disturbance 68.4%, disorientation 56.1%, and visual/oculumotor disturbance 50.9%. Our patient fitted both patterns, as did his later development of myoclonus and akinetic mutism. In the series by Hoshi *et al*.[2] 66.0% developed myoclonus and 56.0% akinetic mutism within 3 months of presentation. Our patient's 11-year (132-month) latency accords with the Japanese experience (range 14 - 275 months, mean 125 months);[3] the time from onset to death, 7.5 months, is at the lower end of the Japanese range (3 - 81 months).[2]

The diagnosis was delayed by the late revelation of a grafting history, normal imaging, and the absence of diagnostic EEG changes. In the series by Hoshi *et al*.[2] only 3 of 57 patients had normal imaging on presentation, while only 2 of 54 failed to show PSD on EEG; 1 of 54 exhibited PSD only on the day of death. Shimizu *et al*.[4] reported 2 patients without PSD

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and illness durations of 8 and 17 months respectively. An Austrian patient without PSD survived 5 months from onset.[5] Kimura *et al*.[6] reported a patient with imaging unchanged throughout his illness, who developed PSD just 2 days before death, 13 months after onset of symptoms. The case described by Takashima *et al*.,[7] without PSD and with normal serial computed tomography (CT) scans, survived 17 months from onset. An American patient grafted with a Tutoplast patch survived 4 months from onset; imaging failed to assist diagnosis, while the EEG revealed only moderate to diffuse slowing.[8] Interestingly, plaque formation was noteworthy in a number of these reports.[5,6,8]

Our case and the literature reports suggest that disease duration may be shorter in patients who do not show PSDs or in whom PSDs develop late. Subsets of graft-associated CJD may exist; this, together with host characteristics, might explain the differing clinical courses and disease phenotypes seen in graft-associated CJD.

Conclusion

Our report adds to the approximately 169 cases of dural graft-associated CJD cases.[9] It supports the view that graft-associated CJD patients are younger than sporadic CJD cases, and are more likely to present with cerebellar abnormalities. Brain imaging without diffusion weighting may not always contribute to the diagnosis. We note an interesting association between delayed or absent PSDs and short illness duration.

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FORENSIC FILES

Lodox Statscan proves to be invaluable in forensic medicine

G J Knobel, G Flash, G F Bowie

The Statscan (Lodox Systems Pty (Ltd), Sandton, South Africa) is a low-dose, digital full-body X-ray machine designed specifically for use in hospital trauma units. The technology was developed by De Beers to be used in X-ray machines that could rapidly determine the location of stolen diamonds on workers using a low radiation dose. The machine makes use of a thin fan-beam X-ray that is scanned down the length of the patient in 13 seconds. A proprietary digital detector consisting of CCD cameras and fibreoptic tapers produces a full-body actual-size image of the patient, which is viewed on a dedicated 21-inch digital viewing station.

The Statscan is approved by the Food and Drug Administration in the USA and has received European Union certification for sale in Europe.

The benefits of the Statscan to trauma radiology are its low dosage to patients and operators, ease of use and ability to provide a full-body image, and the speed of image acquisition.

The Statscan was clinically evaluated at Groote Schuur Hospital's Trauma Unit and is being evaluated for paediatric radiography at Red Cross Children's Hospital. Findings from both sites have been very positive, resulting in the sale and installation of 8 machines in the USA and 2 machines in Sudan.

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