LONG-LASTING LITHIUM NEUROTOXICITY IN AN ADOLESCENT
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SUMMARY
Acute lithium intoxication is well known. A case of long lasting lithium neurotoxicity in an adolescent male is reported, who showed signs of cerebellar as well as brain stem involvement. Persistent lithium neurotoxicity is discussed and the recommendation made that this condition be considered irreversible only if no substantial recovery occurs in the first six months.

Long-lasting neurological sequelae are known to occasionally follow acute lithium intoxication. While a variety of signs are reported in the stage of acute intoxication, the sequelae largely consists of a cerebellar syndrome. Donaldson and Cunningham (1983) reviewed 17 such cases, with a mean age of 54 years. Schou (1984) in a combined literature review and correspondence followed up provided information about the development and further course of long-lasting neurologic sequelae after lithium intoxication in 40 patients. The mean age of the sample was 48 years (range 28-67). Such a complication has not been reported in children. However, young patients are now treated more frequently with lithium than in the past. The case of an adolescent boy who developed such lithium neurotoxicity is reported.

CASE REPORT
S.M., a 15 year-old boy was brought to us on January 24, 1990 with complaints of fever, marked weakness, tremulousness and inability to swallow, speak or stand. He had two past episodes of mania in September 1987 and November 1989 and was on lithium carbonate (750 mg/day) and haloperidol (10 mg/day). There was no history suggestive of pre-existing brain organicity. On January 10, 1990 he was found to be febrile. For the first three days the fever was low grade and most noticeable in the evening. Later it was continuous and ranged from 38.5 to 39 degrees centigrade and was accompanied by anorexia and intermittent non-projectile vomiting. He was taken to a local hospital and treated symptomatically. For the first nine days of the febrile illness he continued to take lithium and haloperidol, at first continuously and then intermittently, before finally stopping it on January 20.

On examination, he was febrile without any obvious focus of infection. There was no alteration in sensorium and vital signs were normal. He had marked parkinsonian features (masked facies, sialorrhea, loss of associated movements and cog-wheel rigidity) and a prominent cerebellar syndrome (dysarthria, ataxia, dysmetria, dystadiadochokinesia and intention tremor). He was dysphasic and had paresis of the tongue and facial muscles (UMN type). Jaw jerk, gag and palatal reflexes were normal. Deep tendon reflexes were brisk bilaterally and plantars flexor. There was no sensory deficit. Within two days of hospitalization, S.M. showed emotional incontinence in the form of involuntary laughs lasting for a few minutes.

Serum lithium estimation on the day of admission was 0.4 meq/l. Laboratory tests (total and differential leucocyte count, erythrocyte sedimentation rate, plasma electrolytes, blood urea, serum creatinine, and liver function tests) were within normal limits. Lumbar puncture was traumatic and CSF examination revealed glucose 75 mg% (N= 50-65 mg%), protein 76 mg % (N= 15-45 mg%), erythrocytes 200-300 and leucocytes 1-2 per high power field. CPK estimation could not be done. X ray chest, skull and CT scan were normal. EEG was abnormal, suggestive of multiple independent focal spike and slow waves bilaterally, more on the right side, in occipital, posterotemporal, parietal and central areas, and left anterior temporal areas.

Treatment was initiated with benztropine mesylate, erythromycin and supportive measures. Within 24 hours he developed urinary retention and benztropine was discontinued. By day four of hospitalization, he was afebrile and his general condition started improving. Over the next three months of hospitalization he showed gradual improvement in neurological symptoms. Parkinsonian symptoms remitted first, followed by paresis of tongue and facial muscles, and emotional incontinence. Partial improvement in ataxia, dysmetria and intention tremor enabled him to take care of his basic needs. Significant dysarthria, however, persisted.

Over the next six months of domiciliary speech therapy and physiotherapy there was almost complete recovery of all functions. At this point in time, he developed hypomanic symptoms and was successfully treated and maintained on carbamazepine (600 mg/day). At the time of latest follow-up (correspondence) he continued to maintain improvement.

DISCUSSION
There is controversy whether lithium-neuroleptic neurotoxicity is a distinct diagnostic entity or simply represents atypical cases of lithium toxicity or neuroleptic malignant syndrome (Ross & Caffey, 1978). The possibility of "irreversible brain damage" caused by a combination of lithium and haloperidol raised by a small series of cases is discounted by larger series which show no such occurrence (Bastrup et al, 1976). Our case initially showed features of lithium toxicity as well as haloperidol induced parkinsonian symptoms, but the later picture was dominated by those symptoms reported as long lasting neurological sequelae of lithium carbonate toxicity. Most cases are reported to have a mixture of signs, suggesting damage at multiple sites in the nervous system, and some
patients are reported to show brain stem features (Donaldson & Cunningham, 1983; Schou, 1984), though features of pseudobulbar palsy have not been specifically reported.

Fever is known to be a common precipitating factor for long lasting neurologic sequelae to lithium intoxication (Schou, 1984). Serum lithium levels are in some cases below the toxic range (Adityanjee, 1987; Verdoux & Bourgeois, 1990), but more often long-lasting neurologic sequelae follow lithium intoxication (Schou, 1984). While some cases are due to intentional overdoses, the majority develop under circumstances when lithium administration should have been stopped. Low serum lithium levels are often due to the considerable delay in drawing blood samples, as in this case.

Long-lasting neurological sequelae have been arbitrarily defined as those persisting for two months after the discontinuation of lithium (Schou, 1984). Tesio (1987) proposed that the minimal criteria for "irreversible lithium effectuated neurotoxicity" should include persistence of cerebellar signs six months after poisoning and discontinuation of lithium. However, in our case, although substantial improvement occurred in the first 6 months, further improvement continued and by the end of 9 months recovery was almost complete. In order to avoid therapeutic nihilism, we propose that the condition should be considered irreversible only if no substantial (say less than 50%) recovery takes place in the first 6 months. Keeping in mind the severity of the symptoms and the prolonged course of the neurological deficits, no effort should be spared to avoid this complication of lithium. Besides providing better information to physician and patients, it may be useful to insist on patients lithium therapy to carry a small card stating, "In case of early signs of dehydration or neurological symptoms lithium administration must be stopped and a physician contacted."

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