

## CASE REPORT

# Recurrent autumnal psychosis

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Acute confusional states in the older patient often have a remediable cause. Every effort should be made to ascertain the cause so that appropriate treatment can be given and future episodes prevented. A patient is described who presented with recurrent episodes of acute psychosis after ingestion of *Atropa belladonna* (deadly nightshade).

A 70 year old Asian woman with a previous history of “schizophreniform” disorder was admitted with a 24 hour history of confusion associated with inability to concentrate, visual hallucinations, delusions, inappropriate laughter, dizziness, and headache. There was no fever, ear discharge, skin rash, herpetic eruption, or any reported change in medication recently. The patient had been diagnosed with recurrent psychosis on account of three such episodes in the preceding three years; each episode had lasted several days. On examination she was disorientated in time, place, and person. She was afebrile, tachycardic, and her pupils were dilated. Both fundi were normal and signs of meningeal irritation were absent. Routine full blood count, renal and liver function tests, urine dipstick, urine and blood cultures, chest radiography, electrocardiography, and cerebrospinal fluid examination (on two separate occasions) were unremarkable. Computed tomography of the brain, viral and bacterial studies of blood, and cerebrospinal fluid were negative. The symptoms were confirmed to be due to ingestion of berries, which the patient’s daughter brought in the next day. The berries grew on a wild shrub close to the patient’s residence (fig 1). As on previous occasions the symptoms had followed ingestion of similar berries in the autumn months. The berries were identified as *Atropa belladonna* or “deadly nightshade”. Chemical analysis of her blood and the berries identified high concentrations of L-atropine, DL-hyoscyamine, and hyoscyne. Over the next 48 hours she gradually improved with supportive treatment and had returned to normal by the fourth day of her hospital admission. The public health department was duly informed about the presence of the shrubs.

### PHARMACOLOGY

*Atropa belladonna* is taxonomically classified in the family solanaceae, which also includes the common potato, tobacco, and chilli pepper. It is a shrub usually found in Britain and Ireland and is occasionally grown in gardens in North America but rarely becomes naturalised. Other members of the nightshade family are sometimes erroneously called belladonna. It can grow up to five feet tall and is usually found in quarries and waste ground. The flowers are greenish-purple, the leaves are oval, and the berries are black and globular (fig 2). In 1809, the active chemical was isolated and by 1819 it was classified an “alkaloid”. All parts of the plant contain alkaloids (L-atropine, DL-hyoscyamine, and hyoscyne), but the highest content is in the ripe fruit and the green leaves. These chemicals act by competitively blocking the binding of acetylcholine



Figure 1 *Atropa belladonna* shrub growing on a well trodden path in the city of Leicester.



Figure 2 (A) Berries of *Atropa belladonna* and (B) a close up view.

to the central nervous system and parasympathetic postganglionic muscarinic receptors.

Main manifestations of ingestion are hallucinations and delusions as well as pyrexia, tachycardia, and anticholinergic effects. Severe cases can lead to hypertension, convulsions, and coma (box 1). Belladonna poisoning has been reported in children and rarely in adults.<sup>1–3</sup>

Management is conservative and consists of observation and nursing the patient in a darkened, quiet environment.

**Box 1: Symptoms and signs of belladonna poisoning**

- *Central nervous system findings:* agitation, ataxia, delirium, hallucinations, choreoathetoid and picking movements, drowsiness, convulsions, and coma.
- *Peripheral nervous system findings:* dilated pupils, dry skin and mucosae, absent bowel sounds, urinary retention, tachycardia, hypertension.
- *Neuromuscular overactivity:* hyperthermia, rhabdomyolysis.

Activated charcoal adsorbs the agents quite well. Benzodiazepines may be used for sedation if the patient is very agitated and anticholinesterase inhibitors like physostigmine are indicated for delirium and agitation and for reversing troublesome anticholinergic effects.<sup>4</sup> The dose is 1–2 mg given intravenously over 3–5 minutes and repeated as required.

**HISTORICAL ASPECTS, USES, AND MISUSES**

The plant has been termed “the Mandragora of Theophrastus”. It is so poisonous it was given the name “atropos”, which is the Greek word for inflexible. Another meaning is that it refers to “one of three Fates who cut the thread of life”.<sup>5</sup> The Greek pharmacologist Dioscorides’s five volume work *De Materia Medica* was the first systematic pharmacopoeia, containing objective descriptions of this species in the first century, but it wasn’t “discovered” for another 1800 years.<sup>6</sup> In Roman times, extracts of belladonna were used by women for the cosmetic value of the pupillary dilating effect; such use explains the origin of the common name “bella donna” (Italian for beautiful woman).

There are many uses for the plant, both beneficial and harmful. The Romans contaminated the food reserves of their enemies with it. The famous Bacchanalian orgies in which women would tear off their clothes and throw themselves to waiting men could have been induced by *A belladonna*. The advent of Christianity stopped such rituals and then it started appearing only in the sorcerers’ and witches’ brews. Before surgery, a mixture of hemlock, mandrake, *A belladonna*, and henbane (known as “sorcerers’ pomade”) was applied to the skin to produce unconsciousness before operations were performed.<sup>7</sup> The use of the plant for the dilatation of the pupil is still very important in the field of ophthalmology. The other active chemical agent, scopolamine was added to morphine in 1902 to produce “twilight sleep” so as to lessen the pain of childbirth. This chemical was also the infamous “truth serum” that was used in so many legal battles in the past. This “serum” may still be used in some countries for “brainwashing”.

**Box 2: Learning points**

- *Atropa belladonna* and other alkaloid poisonings have been documented throughout history.
- Accidental ingestion of *Atropa belladonna* is probably not uncommon.
- Common manifestations are hallucinations, psychotic behaviour, pyrexia, tachycardia, dilated pupils, and urinary retention.
- Severe cases can lead to hypertension, convulsions, and coma.
- Clinicians need to be aware of this diagnosis as appropriate treatment and prevention depend on early recognition.

Throughout the world many people are poisoned by organophosphorus in insecticides, either accidentally or through attempted suicide. Atropine is the mainstay of treatment in these situations. Atropine and its derivatives have been used in more recent times to treat a number of medical problems, including asthma, bradycardia, peptic ulcers, abdominal colics, and for the treatment of Parkinson’s disease, apart from its uses in anaesthesiology and cardiac arrests.

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