

Foxglove poisoning

Nigel I Jowett

INTRODUCTION

Digitalis purpurea is a native of Europe, first known by the Anglo-Saxon name *foxes glofa* (fox's glove), and grows freely in British woods and lanes. It is one of the homeopath's pre-eminent heart therapies, and was introduced to the London Pharmacopoeia in 1750. Foxglove leaves were used to treat chronic sores and ulcers, and expressed juice was used for scrofulous swellings (abscesses). It did not receive much popularity until 1775

when Dr William Withering began to experiment with an old family herbal 'recipe' containing foxglove (Bessen, 1986), and *Digitalis purpurea* (foxglove) and *Digitalis lanata* (woolly foxglove) are still cultivated as a source of medicinal digoxin. Although poisonous, foxgloves continue to be used in herbal therapeutics.

In the UK, most plant exposures occur in children younger than 6 years, are usually accidental and without significant toxicity. Foxglove poisoning is normally associated with intentional ingestion by adolescents and adults, sometimes with suicidal intent.

Foxglove leaves may be confused with comfrey, a plant occasionally chosen as a salad ingredient or for making tea (Colls, 1999), although the bitter taste often deters ingestion, and sometimes provokes spontaneous vomiting.

DISCUSSION

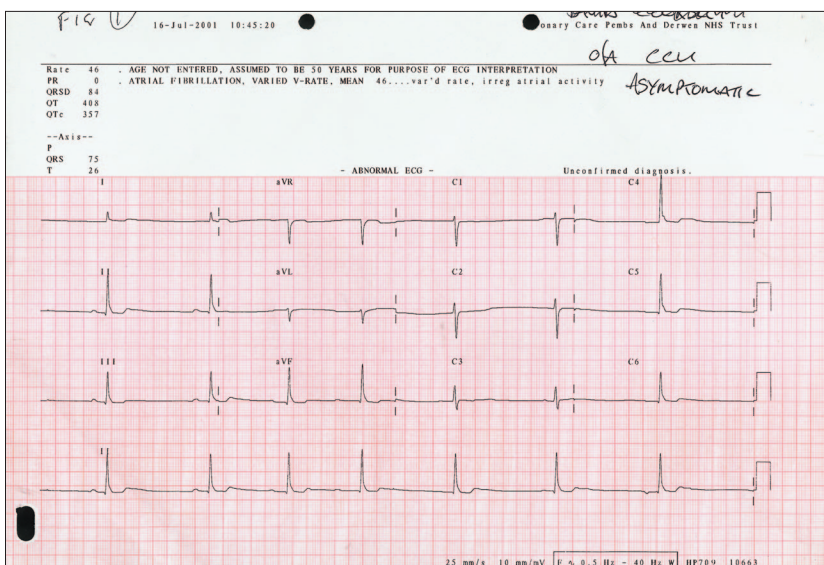
Cardiac glycosides are found in a diverse group of plants including *Digitalis purpurea* and *Digitalis lanata* (foxgloves), *Nerium oleander* (common oleander), *Convallaria majalis* (lily of the valley) and *Strophanthus gratus* (ouabain). The main toxic components are digitoxin, digitalin and digitonin. Poisoning may occur after consuming the leaves, flowers or seeds. Foxglove leaves are particularly toxic at the commencement of flowering (June to September), when two or three leaves may be fatal. Herbal preparations of dried foxglove leaves or other plant parts may be used in a medicinal tea as a heart tonic (Dickstein and Kunkel, 1980; Bain, 1985). Intentional overdoses with homemade extracts may occur (Rich et al, 1993), but this was not the purpose in this case.

Foxglove poisoning presents with nausea, vomiting or visual disturbances, although the cardiac effects are the most dangerous. Dysrhythmias are characterized by increased automaticity and conduction blockade. The electrocardiogram (ECG) is usually abnormal, showing bradycardia, prolongation of the PR and QRS complexes, sinus arrest, varying degrees of atrioventricular blockade or escape rhythms. Paroxysmal atrial tachycardia with block is characteristic, but malignant ventricular dysrhythmias including ventricular tachycardia and ventricular fibrillation may occur.

Hyperkalaemia is common, as well as a metabolic acidosis. Digoxin levels are usually not helpful, as detectable levels

Dr Nigel I Jowett is Consultant in Cardiovascular Medicine, Withybush Hospital, Pembrokehire & Derwen Health Trust, Haverfordwest, Pembrokehire SA61 2PZ

Figure 1. 12-lead electrocardiogram taken on admission to coronary care.



CASE REPORT

A 39-year-old man presented to the emergency department with nausea, light-headedness and blurred vision. An hour earlier he had drunk an infusion of foxglove leaves boiled in water, which he had taken as a heart tonic. There was a previous history of drug abuse.

On examination, he was bradycardic at 50–60 beats per minute. The blood pressure was 140/60 mmHg. The 12-lead electrocardiogram (ECG) showed bradycardia with varying heart block (Figure 1). Laboratory investigations revealed a serum potassium 5.5 mmol/litre and normal magnesium levels. Blood pH and gases were normal. A digoxin level was over 5.0 nmol/litre (normal therapeutic range = 1.0–2.6 nmol/litre).

The patient was admitted to the coronary care unit and treated with intravenous magnesium by infusion. Atropine was given to a total dose of 1.2 mg, without significant effect on his heart rate. A 10 vial Digibind infusion (Glaxo Wellcome, Uxbridge, Middlesex) was then started, while the serum potassium was monitored and corrected. Vomiting stopped within an hour, and normal sinus rhythm was re-established. By 6 hours, he felt well and self-discharged from hospital against advice.

only confirm exposure and do not correlate with severity of the poisoning.

Oral activated charcoal prevents further absorption. Atropine may be used for bradycardia and lignocaine, phenytoin or beta-blockade for ventricular dysrhythmias. Magnesium has been reported to reverse digoxin-induced dysrhythmias. Digoxin Fab fragment antibodies (Digibind, Glaxo Wellcome, Uxbridge, Middlesex) by infusion are

an effective antidote for some plant cardiac glycosides, but not always for foxglove (Cheung et al, 1991; Rich et al, 1993). Dosage is usually calculated from blood digoxin levels, but as these do not necessarily reflect the degree of poisoning, empirical treatment with 5–10 vials may be given in the first instance. Onset of action may take 60 minutes, but reversal of toxicity should be complete within 6 hours. **HM**

Bain RJ (1985) Accidental digitalis poisoning due to drinking herbal tea. *BMJ* **290**: 1624
Bessen HA (1986) Therapeutic and toxic effects of digitalis: William Withering, 1785. *J Emerg Med* **4**(3): 243–8
Cheung K, Urech R, Taylor L, Duffy P, Radford D (1991) Plant cardiac glycosides and digoxin Fab antibody. *J Paediatr Child Health* **27**(5): 312–3
Colls BM (1999) Three very unwise men. *BMJ* **318**: 1729
Dickstein ES, Kunkel FW (1980) Foxglove tea poisoning. *Am J Med* **69**(1): 167–9
Rich SA, Libera JM, Locke RJ (1993) Treatment of foxglove extract poisoning with digoxin-specific Fab Fragments. *Ann Emerg Med* **22**: 1904–7