Datura stramonium poisoning in horses: a risk factor for colic

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PLANTS are one of the most frequent causes of poisoning in horses, due to the horse's general behaviour. These poisonings are usually associated with potentially dangerous garden refuse, including hedge clippings (for example, cherry, laurel or English yew) that are left in the vicinity of horses, or to poisonous plants, which are found mixed in their hay. However, in general, cases of poisoning are accidental rather than deliberate (Delaunois and others 1998). Horses may be induced to consume dangerous plants if, for example, little other forage is available or if they are very thirsty. There is a widespread belief that animals' instincts protect them, but this cannot be relied on (Bamka 1999). A good knowledge of potentially dangerous plants, together with proper management of horses, pasture and hay, is the best way to avoid incidents of poisoning.

Thorn apple (*Datura stramonium*), also referred to Jimson weed, Jamestown weed, moon flower, stinkblaar or olieboon, is well known to be poisonous to human beings and livestock, and accidental poisoning of dogs has also been described (Tostes 2002). It is native to the tropics and easily observed all around Spain; it is common in barnyards, feedlots (especially those housing pigs), cultivated fields of sunflowers, maize and lucerne, roadsides, wasteland and other disturbed habitats (Oladosu and Case 1979). *D stramonium* is an annual weed that grows 75 to 90 cm tall, with an erect, stout stem and spreading branches near the top, unpleasant-smelling, alternating leaves that are unevenly or sharply toothed and glabrous, a funnel-shaped corolla, and hard, prickly fruit with a whitish or purplish colour. The fruits ripen in autumn and split open to reveal numerous wrinkled, black seeds (Cooper and Johnson 1998).

All parts of the plant are poisonous, especially the seeds, which accumulate higher amounts of toxic compounds (Williams and Scott 1984): the tropane alkaloids hyoscyamine, atropine and hyoscine (scopolamine). The anticholinergic substances exert a predominantly antimuscarinic effect by competitive inhibition of acetylcholine binding, resulting in a blockage of autonomic impulses at the level of the neuroeffector junctions (Schulman and Bolton 1998). The toxic effects are reported to include teratogenic effects, mild gastrointestinal clinical signs, neurological signs and death (Nelson and others 1982). However, due to the plant's particular odour and taste, animals seldom consume enough of it to be affected, and poisoning is usually associated with the contamination of feeding stuffs with the seeds or dry plant material, rather than direct consumption (Delaunois and others 1998).

This short communication describes an outbreak of *D stramonium* poisoning in horses in Spain as a result of the ingestion of lucerne hay grossly contaminated with dry *Datura* plant matter.

An equine centre located in Toledo, central Spain, contained 15 horses, which were confined and typically fed barley, fodder, oat straw and lucerne hay. In September 2000, a veterinary surgeon visited the centre in response to a call for assistance; one horse was displaying a moderate colic, with signs of abdominal pain, anxiety and increased borborygmi; the horse's temperature and hydration status were normal but its mucous membranes were slightly reddened. The clinician instigated a regimen of no food and administered 60 mg/day butylscopolamine bromide (Buscapina compositum; Boehringer Ingelheim) intravenously, and furosemide (Seguril; Aventis) intravenously, 20 mg/ampoule, five ampoules in the first dose, followed by two ampoules every hour until the horse urinated. To support liver function, the horse received 250 ml 40 mg/ml methionine (Norepar; Merial) and 20 ml 75 mg/ml betaine glucuronate (Norepar; Merial) intravenously. After a moderate walk, the horse was observed to urinate, and its general condition improved.

FIG 1: Prickly fruits of *Datura stramonium*, easily identifiable in a bale of lucerne hay submitted to the laboratory

The next morning, the horse was in a satisfactory condition, but a second horse started showing similar clinical signs. The same treatment was instituted and, as with the first horse, recovery was observed. One day later, two more horses developed the same clinical signs; these horses also received the same treatment, but only one of them seemed to improve; the other horse died after six hours, despite intravenous serum therapy being instituted. For all the affected horses, the general treatment included liver function support for three days and activated charcoal. It was observed that the horses' recovery was better with more intense restriction of their feed, especially when the lucerne hay was eliminated from their diet.

On opening the abdomen of the dead horse, general congestion of the abdominal cavity was observed, with oedematous and very gaseous content of the intestinal loops. A gastric rupture involving the greater curvature of the stomach (7 to 8 cm in length), with spillage of the gastric contents into the omentum and peritoneal cavity was observed. The gastric content was very liquid and blackish in colour. Congested kidneys and lungs were also observed; this was attributed to increased intra-abdominal pressure and respiratory distress.

Inquiry revealed that all the horses had been fed on a new lot of lucerne hay three days before the clinical signs were first observed. The clinician inspected the feed, and a large amount of a desiccated plant locally called 'cardo de castañitas' was observed mixed in with the hay. The horses' owner stated that all the hay had been bought from a local farm, and they were a 'bargain, because they were the last remaining', as indicated by the seller.

A complete hay bale was sent to the authors' laboratory, and detailed inspection revealed that it consisted of dry lucerne (6·85 kg) and a large amount of *D stramonium* prickly fruits and stems (7·15 kg), with occasional seeds (Fig 1). *D stramonium* thus made up 51 per cent of the total weight of the bale. The botanical identification of the plant confirmed the suspected diagnosis of *Datura* poisoning. The lot of lucerne hay was destroyed; no further cases of poisoning occurred.

There are few reports of *Datura* species poisoning in horses; previous reports describe a subacute to chronic course of intoxication before the onset of clinical signs, with variable mortality in the affected horses (Schulman and Bolton 1998).

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The first case was observed in 1923, when a mule died after eating some of these plants growing in the pasture, showing signs of narcosis (King 1923). Some years later, another case was observed in ponies, in this case associated with feed contamination (Barney and Wilson 1963). Clinical signs of anorexia, hyperexcitability, mydriasis and polyuria were the most frequent signs observed, associated with general incoordination.

In New Zealand, two horses were suspected of being poisoned by consuming *D stramonium* seeds that were found as contaminants in a proprietary horse meal (Williams and Scott 1984). The animals presented general signs of poisoning: they were depressed, anorexic and had lost weight. Polyuria, polydipsia and diarrhoea were also described, but neither horse died. In Hungary in 1993, nine horses died 24 to 72 hours after eating feed containing 60 to 300 g of *D stramonium* seeds. Clinical signs, which appeared six to 24 hours after ingesting the seeds, included restlessness, colic, laboured breathing, increased heart rate, constipation, dilated pupils and dry oral and nasal mucosae (Sályi and Abonyí 1994). Another intoxication of two South African horses was also related to seed-contaminated feed; clinical signs were associated with severe colic and an impacted distal colon; mydriasis, intense depression, hyperexcitability, tachycardia, dryness of the oral and nasal mucosae and polyuria were also observed. When these horses were examined postmortem, gastric rupture and intestinal loops filled with gas and ingesta were observed (Schulman and Bolton 1998).

According to these reports, the clinical signs in the present cases were consistent with *Datura* species poisoning, colic being the most remarkable. Colic was also described in the cases in Hungary (Sályi and Abonyí 1994) and South Africa (Schulman and Bolton 1998). The death of one horse as a consequence of gastric rupture as a sequel to *Datura* species poisoning is of particular interest; this has previously been described only in a stallion (Schulman and Bolton 1998). In both cases the physical integrity of the greater curvature of the stomach was compromised. Gastric rupture could be a consequence of a secondary dilation caused by the production of gas, due to a reduction of gastrointestinal muscle tone (paralytic ileus) as a pharmacological effect of the toxic alkaloids.

There is a general lack of information about the specific levels of toxicity of *D stramonium* to horses (Williams and Scott 1984). It has been established in cattle that the consumption of 0·06 to 0·08 per cent of an animal's bodyweight of the plants, or up to 991 seeds/g of feed, is fatal (Oladosu and Case 1979, Nelson and others 1982). Similarly, a level of 2·7 mg of hyoscyamine/kg feed in pigs causes dullness and anorexia, with staring coat and hard, dry faeces (Clarke and others 1981). A retrospective evaluation of *Datura* species poisoning of horses stated that a toxic dose was 75 mg seeds/kg bodyweight, equivalent to 0·5 per cent of *Datura* species seeds in the feed, over a period of 10 days (Williams and Scott 1984). It has also been observed that massive contamination of feed with approximately 25 per cent by volume of *Datura* species materials appears to be sufficient to induce peracute signs of poisoning and death in horses (Schulman and Bolton 1998).

In all the previously reported cases, the main described cause of poisoning in horses was the contamination of feed (grain mixtures or meal) with *Datura* species seeds (Barney and Wilson 1963, Williams and Scott 1985, Sályi and Abonyí 1994, Schulman and Bolton 1998); only one case resulting from consumption of the green plant growing in pasture has been reported (King 1923). The present case is the first reported case in horses in which the origin of the intoxication was the consumption of hay contaminated with dried *Datura* species plant material.

Although colic may not be as common a health problem in equids as other health-related conditions, its severity and potential for mortality make it very important (Kaneene and others 1997). The present report highlights *D stramonium* poisoning as a possible cause of colic in horses; the authors emphasise the importance of considering poisonous plants when an aetiologic diagnosis has to be established. They also wish to draw attention to the potential risk of purchasing feed, usually of a low quality, at a low cost. At least, and as a preventive step, they recommend that an appropriate visual inspection of the fodder be made before it is offered to the animals; some toxic plants, such as thorn apple, can be easily recognised if they are mixed in with hay.

References

BAMKA, W. J. (1999) Poisonous Weeds in Horse Pastures. Rutgers Cooperative Extension Fact Sheet FS938. New Brunswick, State University of New Jersey

BARNEY, G. H. & WILSON, B. J. (1963) A rare toxicity syndrome in ponies. *Veterinary Medicine* **58,** 419-421

CLARKE, M. L., HARVEY, D. G. & HUMPHREYS, D. J. (1981) Poisonous plants. In Veterinary Toxicology. London, Baillière Tindall. p 252

COOPER, M. R. & JOHNSON, A. W. (1998) Poisonous plants and fungi in Britain. Animal and Human Poisoning. 2nd edn. Norwich, The Stationery Office. pp 202-205

DELAUNOIS, A., DEMOULIN, V. & GUSTIN, P. (1998) Les principales plantes toxiques chez le cheval. *Annals de Médicine Vétérinaire* **142,** 321-332

KANEENE, J. B., MILLER, R., ROSS, W. A., GALLAGHER, K., MARTENIUK, J. & ROOK, J. (1997) Risk factors for colic in the Michigan (USA) equine population. *Preventive Veterinary Medicine* **30,** 23-36

KING, E. D. (1923) Jimson weed poisoning. *Journal of the American Veterinary Medical Association* **64,** 98-99

NELSON, P. D., MERCER, H. D., ESSIG, H. W. & MINYARD, J. P. (1982) Jimson weed seed toxicity in cattle. *Veterinary and Human Toxicology* **24,** 321-325

OLADOSU, L. A. & CASE, A. A. (1979) Large animal hepatotoxic and nephrotoxic plants. *Veterinary and Human Toxicology* **21,** 363-365

SÁLYI, G. & ABONYÍ, T. (1994) Poisoning by *Datura stramonium* seeds in horses. *Magyar Állatorvosok Lapja* **49,** 658-662

SCHULMAN, M. L. & BOLTON, L. A. (1998) *Datura* seed intoxication in two horses. *Journal of the South African Veterinary Association* **69,** 27-29

TOSTES, R. A. (2002) Accidental *Datura stramonium* poisoning in a dog. *Veterinary and Human Toxicology* **44,** 33-34

WILLIAMS, S. & SCOTT, P. (1984) The toxicity of *Datura stramonium* (thorn apple) to horses. *New Zealand Veterinary Journal* **32,** 47

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