

Case Report

Amitraz Toxicity in a Horse

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Abstract A 3-year-old Thoroughbred mare was presented to the Equine Clinic, Kasetsart University Veterinary Teaching Hospital following the pour-on amitraz treatment for two days. The horse showed typical clinical signs of colic including depression, inappetite, pawing, sweating, non-defecation, anuria, and ataxia. The clinical examinations revealed heart rate 38 beats/minute, respiratory rate 17 breaths/minute, small and firm fecal balls covered with white membrane, and impaction at pelvic flexure of the large colon. The horse survived after intensive symptomatic treatment with intravenous fluids therapy, intermittent gastric lavages, intravenous non steroid anti-inflammatory drugs, yohimbine, and enteral fluids administration via nasogastric tube. The horse was completely recovered within 72 hours after the initiation of yohimbine administration. **Chiang Mai Veterinary Journal 2014; 12(3): 231-236**

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Introduction

Amitraz has been globally used in agriculture and veterinary medicine since 1974 as pesticide and acaricide, respectively. In veterinary medicine, amitraz is used to control external parasites such as tick, mite, and mange in dog, cattle, and sheep. A manufacturer recommended that its use is contraindicated in cats and horses (Smith, 1994). However, amitraz still commonly

is prescribed for treatment of feline scabies and demodicosis (Cowan and Campbell, 1988; Scott et al., 1996). There had been some reports on amitraz intoxication in cats following topical administration (Gunaratnam et al., 1983; Soli and Braseth, 1992). Amitraz is a formamidine derivative that activates both alpha1 adrenergic (centrally) and alpha2 adrenergic receptors (peripherally). The drug also inhibits the enzyme

monoamine oxidase (MAO) activity (Hsu, 1996) and prostaglandin E2 synthesis (Jorens and et al., 1997). In mammals, the main mechanism of action involves activation of alpha2 adrenergic receptor similar to the mechanism of action of alpha2-adrenergics agonist such as xylazine hydrochloride.

Exposure to a high concentration of amitraz via inhalation, ingestion, or dermal route causes toxicities in both animal and human. The clinical signs of toxicities include loss of consciousness (Noble, 2002; Miller and O'Callaghan, 2002), respiratory depression, mydriasis (Andrade et al., 2007), hypothermia, bradycardia (Zipes, 1992), and hypoglycemia (Andrade et al., 2005; Doganay et.al., 2002; Hsu, 1996; Proudfoot, 2003). A decrease in an activity of the intestinal smooth muscle activity also has been reported (Hsu and McNeel, 1985; Lavole and Hinchcliff, 2002). However, a clinical sign of diarrhea suggesting that amitraz may capable of increasing the intestinal motility have been reported in children (Atabek et al., 2002 and Aydin et al., 1997). This article is a report on clinical case of amitraz toxicosis in an adult horse caused by an extra label used of a pour-on amitraz. Observable clinical signs of toxicosis in our case report include suppression of cardiopulmonary function and colic.

Case Report

A 3-year-old Thoroughbred mare was referred to the equine clinic at Kasetsart University Veterinary Teaching Hospital with clinical signs of inappetite, anxiety, sweating, non-defecation,

and anuria for two days following a topical administration of undiluted amitraz. During the clinical examination, the mare showed signs of depression, pawing, laid down, chewing, ataxia, moderate abdominal distension, and lack of gut sound. A gastric lavage yield fermented gastric contents. A small amount of fecal balls evacuated prior to a rectal examination were surrounded with white membrane, which is characterized by muco-gelatinous like film. Result from the rectal examination indicated an impaction at the pelvic flexure of the large colon. The mare also showed signs of 7% dehydration, heart rate 38 beats/minute, respiratory rate 17 breaths/minute, and absent gut sound.

On the first day of treatment, the horse was subjected to symptomatically treatments. The treatments include intravenous administration of isotonic crystalloid fluid (calculating volume is base on maintenance add replacement), 250 ml of calcium borogluconate, and 1.1 mg/kg of flunixinmeoglumine to ameliorate clinical signs of colic. A total dosage of 0.2 mg/kg of atropine sulfate was also administered to the horse. A quarter of the calculated dosage of atropine sulfate was intravenously administered, while the rest of the calculated dosage was intramuscularly administered to increase heart rate and may potentiate hypertension. Moreover 20 mg/kg of sucrate, 1.0 g/kg of magnesium sulfate, and enteral fluid were administered to the horse through a nasogastric tube to prevent ulceration of the gastrointestinal mucosa and to treat impaction at the pelvic flexure.

On the second day of the treatment, the horse demonstrated clinical signs of mild depression, pawing, chewing, and sweating. A small amount of urine and white membrane covered fecal balls were observed on a floor of the stable. The gut sound was still absent. Treatments being performed during the second day were similar to that of the first day.

On the third day of the treatment, the horse showed improvement in its mental status and colic signs. An additional prescription of yohimbine at a dosage of 0.05 mg/kg IV twice a day was started. After the first administration of yohimbine, there was a complete reversion of lethargy and the gut sound was returned to normal within less than 24 hours after the first administration of yohimbine.

Treatment during the fourth to the sixth day included administration of electrolyte and enteral fluid through nasogastric tube. A small amount of concentrates and forages were fed to the mare initially. Regular amounts of concentrates and forages were fed after the mare was completely recovered. The mare showed heart rate 43 beats/minute, respiration rate 25 breaths/minute, normal gut sound and green soft fecal balls on the seventh day.

Discussion

Amitraz is a formamidine derivative (1,5 di-(2,4-dimethylphenyl)-3-methyl-1,3,5-triazapenta-1,4-diene) which is rapidly absorbed and hydrolyzed to mono-N-methyl derivatives in 30–120 min after ingestion (Bonsall and Turnbull, 1983) and reach the peak in plasma concentration

within 1.5-6 h. Its metabolized are excreted mainly through urine and partly through bile. The elimination half-life of amitraz in dog is 23.4 ± 2.3 h (Hugnet et al, 1996). A complete elimination of amitraz could take more than 72 h. Amitraz is contraindicated for horses. However, it is widely used in some countries for treatment of external parasites in horses because of its efficacy and low price. The commercial compound contains 12.5-20% of amitraz in xylene. The common side effects of the compounds include drowsiness dry skin and rough hair coat. High doses exposure of amitraz causes toxicities. Roberts and Seawright (1979) reported the first case of amitraz toxicity in horses. Auer et al. (1984) reported amitraz intoxication in horses after a spraying of 0.025% aqueous solution (mass/volume). Presented clinical signs in this report included CNS depression and colic caused by impaction. The horses in our case report showed severe clinical signs of colic, which might be because the poured-on amitraz solution being exposed to the mare in this case was undiluted.

The treatment principle of amitraz toxicities is similar to that of others toxicities caused by other toxic substances. Ability to recognize the clinical signs of toxicity, identify a source of toxicity, and treat at its early staged are the crucial points for a successful treatment. Supportive and symptomatic treatments are essential in amitraz toxicity. Most of the reported-cases of amitraz oral toxicity recovered with administration of 2 g/kg of activated charcoal (PO), atropine sulfate, and gastric lavage. Gastric lavage is still a controversial treatment in

human because of the presence of petroleum distillation in amitraz formulations (Garnier et al., 1998; Proudfoot, 2003; Yilmaz and Yildizdas, 2003). The mare in our case report was subjected to a gastric lavage as a part of colic diagnostic protocol and for rehydration.

An antidote is a substance which can neutralize or reverse the pharmacological effects of a certain pharmacological active compound, and can be classified according to their mechanism of actions either chemical or pharmacological. A specific antidote for amitraz toxicity has not been established. Atipamezole (0.05-0.2 mg/kg, slow IM) and yohimbine (0.1 mg/kg, slow IV) are pharmacologic antidote which act as alpha2 adrenergic antagonist. They have been shown to be useful in various animal studies but have not been tested in humans yet (Proudfoot, 2003). In equine medicine, there is only report of yohimbine utilization to block the sedative action of formamidine compound (Queiroz-Neto et al., 2000). In our case report, we administered yohimbine to the mare with a half dosage recommended by the literature cited. A decision on initiation of its administration was also delayed due partly to the long period after the initial exposure until the arrival of the mare after being referred. However, the clinical signs of toxicity improved and the mare was recovered to her normal status after the administration of yohimbine. The results of the treatment in this case report indicated that yohimbine administration can be used for treating prolonged onset case of amitraz poisoning.

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พิษของอมิทราชในม้า

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วิทยาเขตกำแพงแสน นครปฐม

บทคัดย่อ ม้าพันธุ์โทโรเบรด เพศเมีย อายุ 3 ปี ถูกนำส่งโรงพยาบาลสัตว์ มหาวิทยาลัยเกษตรศาสตร์ จากการที่เจ้าของใช้อมิทราชราดบนตัวม้าเมื่อ 2 วันก่อนนำมาโรงพยาบาล ม้าแสดงอาการของปัญหาเสียดท้อง ได้แก่ ซึม ไม่อยากอาหาร คู้ย เหงื่อออก ไม่พบการถ่ายมูลและปัสสาวะ และเดินโซเซ ผลการตรวจทางคลินิกในวันที่เข้ารับบริการที่โรงพยาบาลสัตว์พบว่า อัตราการเต้นของหัวใจ 38 ครั้ง/นาที อัตราการหายใจ 17 ครั้ง/นาที พบก้อนมูลแข็ง ขนาดเล็ก และมีเยื่อสีขาวหุ้มก้อนมูลและการอัดแน่นของอาหารภายในลำไส้ใหญ่ส่วนโค้งบริเวณเชิงกราน ม้าได้รับการรักษาตามอาการ ได้แก่ การให้สารน้ำทางเส้นเลือดดำ การล้างท้อง การให้ยาลดอักเสบ การให้ยาโยอิมบินทางเส้นเลือดดำ และการให้สารน้ำเข้าสู่กระเพาะอาหารโดยผ่านทางท่อสายยางซึ่งสอดเข้าทางช่องจมูกม้า และกลับมามีอาการปกติ ภายหลังจากได้รับยาโยอิมบินเข็มแรก 72 ชั่วโมง

คำสำคัญ: อมิทราช ความเป็นพิษ ม้า
