

A safe, fast and successful induction of parturition in a bitch: a case report

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Abstract

We report the first case of using an intravenous nitroglycerine administration for cervical dilation and oxytocin to induce whelping in a bitch in safe, fast with a good outcome.

Keywords: Bitch; Induce parturition; Nitroglycerine; Oxytocin

Introduction

Since the triggering mechanism for parturition in bitches remains unclear, it has been difficult to select or develop drugs that are useful for the induction of parturition. Ideally, this drug should induce whelping with a high efficiency and within a predictable, short time frame after treatment. In addition, treatment should be safe for the bitch and her puppies, i.e. it should induce a normal parturition without side effects. Attempts to induce parturition in the bitch have been unsuccessful (Noakes *et al.*, 2001). Kutzler (2003) reported that no drugs were approved to terminate pregnancy in dogs in the United States. Clinical studies using prostaglandins to induce parturition or abortion due to closed cervix resulted in pyometra or ruptured uterus (Johnston *et al.*, 2001). Recently, Fontbonne *et al.* (2009) reported a successful induction of parturition in bitches using aglepristone a progesterone-receptor blocker but with a very long time (> 25 h) to start parturition and should be administered twice with 24 h apart. It had been suggested that glyceryl trinitrate (GTN; its chemical name is nitroglycerine) might be effective for the cervical relaxation in woman through intravenous (Dufour *et al.*, 1997) or sublingual (Weeks, 2008) routes of ad-

ministrations. Nitric oxide generated from nitroglycerin, have been found to ripen the cervix (Sharma *et al.*, 2005). Nitroglycerin might then be a useful compound when uterine relaxation of short duration is needed. Recent reports have described the successful application of intravenous nitroglycerin for various obstetric emergencies when uterine relaxation has been required (Weeks, 2008). We report the first case of using an intravenous nitroglycerine (nitric oxide donor) administration for cervical dilation and oxytocin to expel puppies in a bitch, with a good outcome.

Case description

A bitch 3.5 y old weighing 25 kg pregnant at term (>58 days recognized from records of date of mating in the farm) of local breed presented from the experimental animal farm of college of veterinary medicine, university of Mosul, without any signs of labor. She had no notable medical or surgical history. Ultrasonic examination with the bitch on dorsal recumbency showed four live fetuses. On vaginal examination using endoscope showed complete closure of the cervix and sealed with mucus (Fig. 1).

Treatment

Rectal temperature was 37.6°C measured before treatment. The bitch was initially sedated with xylazine 5 mg/kg BW IM. Intravenous drop by drop

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infusion for 30 minutes of 15 mg nitroglycerine mixed with 300 ml of normal saline solution 0.9% administered to the bitch after sedation according to the dose recommended to woman ranged 5-200 mg by Dufour *et al.* (1997). Endoscopic examination of the cervix after nitroglycerine administration revealed complete cervical dilatation (Fig. 2) and the rectal temperature was 37.2°C. After determination of cervical dilatation, oxytocin 10 IU IM injected in three doses 10 minutes apart was injected. Rectal temperature was 37.5°C after the 1st oxytocin injection and 37.5°C after 3rd oxytocin injection. Rectal temperature was 38.2°C after 1 h of the last oxytocin injection. The bitch was sent to the animal house and noticed closely. The bitch was restless, indifferent to food and inclined to pant and straining initiated 2 h after the 3rd oxytocin injection. The bitch remains in her bed in sternal recumbency, although sometimes she may stand and move about during straining efforts. The water-bag of the first fetus appears at the vulva, and followed by a series of efforts attains the size of a golf-ball. It was ruptured by the bitch that licks vigorously at her vulva. Then delivery of the first puppy was completed after 3 h of the 3rd oxytocin injection and 4.5 h after nitroglycerine administration. The remainder of the 3 puppies delivered in less than 1 h. The bitch rests for a time after the birth of her four puppies. She lies licking her puppies, and soon begins to suckle. After one week the bitch and her puppies were doing well.

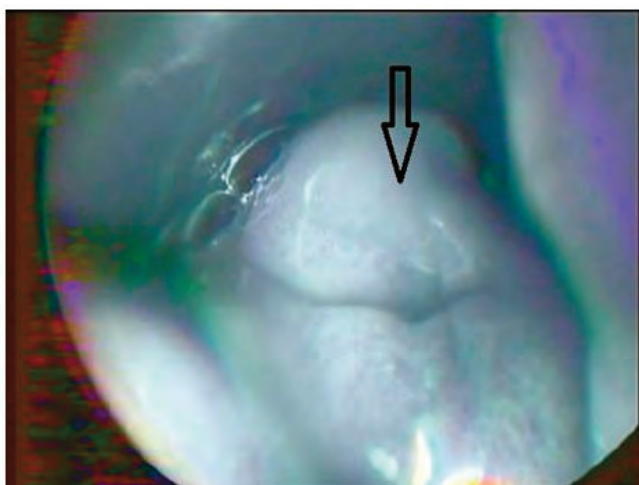


Fig. 1 Showing completely closed cervix (arrow) before induction of parturition using endoscope.

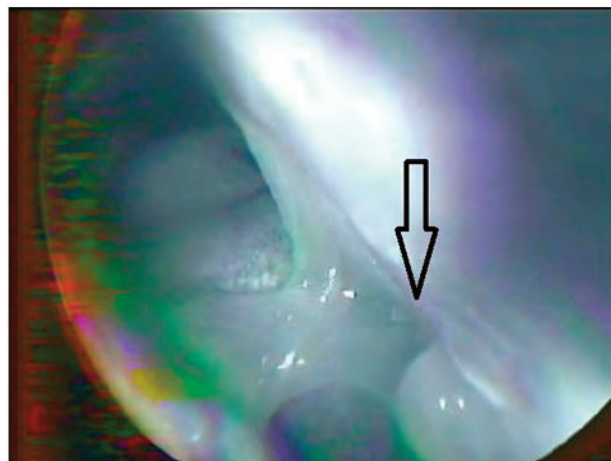


Fig. 2 Showing cervical dilatation and escape of fetal fluids from the external cervical opening (arrow) after nitroglycerine administration using endoscope.

Discussion

This is the first report of safe, fast and successful induction of parturition in a bitch using nitroglycerine and oxytocin. During parturition, the cervix undergoes changes in two phases: ripening, which involves collagen realignment, and dilation. Cervical ripening is associated with changes in local cytokines and prostaglandins, as well as in other bio-regulators that play roles in inflammation and in collagen metabolism (Sennström *et al.*, 2000). These factors also take part in the regulation of nitric oxide synthesis and release (Maul *et al.*, 2003). Chwalisz *et al.* (1997) suggested that nitric oxide is a factor in cervical ripening and this ripening can be mediated via the application of a nitric oxide donor. Cervical ripening is a fundamental part of the conditioning phase of parturition, and it occurs independently of uterine contractions (Chwalisz and Garfield, 1998). The mechanism of action of nitric oxide in the cervical ripening process remains unknown. Nitric oxide has been shown to stimulate prostaglandin production via induction of COX-2 and cytokine release (Sennström *et al.*, 2000). In the bitch there is a clear correlation between body temperature and exceeding of parturition (Barber, 2003). There was a sudden drop in body temperature after nitroglycerine administration which indicates an initiation of parturition. Other studies using prostaglandins (Meier and Wright, 2000) to induce parturition or abortion resulted in pyometra or ruptured uterus due to closed cervix (Johnston

et al., 2001). Aglepristone a progesterone-receptor blocker could successfully induce whelping (Baan *et al.*, 2008; Fontbonne *et al.*, 2009) but with a very long time (> 25 h) to start parturition and should be administered twice, 24 h apart. The induction of parturition in this bitch using nitroglycerine and oxytocin ended safely in less than 6 h.

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