

Original Research Article

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Assessment of Puppies Born from Caesarean Section with Dexmedetomidine Premedication under General Anaesthesia

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ABSTRACT

Keywords

Caesarean, Apgar score, Dexmedetomidine, Dogs

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The study was carried out in full term pregnant dogs with history of dystocia presented to the Veterinary Clinical Complex, Namakkal. The dogs with primary and secondary dystocia were treated with medical management. Clinical, Ultrasound, radiographic, vaginal examinations were carried out and emergency caesarean section was planned in the dogs which did not deliver after medical management. Dogs were divided into group I and II with 6 animals in each group. Group I dogs were premedicated with dexmedetomidine, induced with propofol and maintained under isoflurane inhalation anaesthesia. Group II dogs were directly induced with propofol without premedication. The neonates born from caesarean section were evaluated with Apgar score.

Introduction

Prolonged labour prior to delivery causes maternal physiologic compromise, resulting in foetal depression due to decrease in placental perfusion, hypoxemia and acidosis. Timing and preparation are extremely important for puppy survival for emergency CS (Moon and Erb, 2002). The Apgar score is designed to guide physicians in providing care to vulnerable young ones immediately after birth. The score is particularly useful in assessing clinical status of puppies (Apgar, 1953). Dexmedetomidine is a newer alpha 2 adrenergic agonist which is a potent sedative and analgesic agent. It is a pregnancy safe drug with adequate muscle relaxation. Although propofol crossed placental barrier, it is rapidly cleared from neonatal circulation

and can be used successfully for caesarean section in canines (Doebeli *et al.*, 2013).

Materials and Methods

Twelve full term dogs irrespective of breed, age and history of previous whelping were presented to the Veterinary Clinical Complex, Namakkal with a history of dystocia. All the dogs had a history of mating for more than 63 days. Physical and clinical examination was performed. Foetal heart beats were assessed by ultrasound. Radiographic examination revealed number of foetus. Vaginal examination was done with lubricated finger to assess the cervical os opening. The dogs with primary and secondary dystocia underwent medical treatment with injection of calcium intravenously and, or oxytocin in

dextrose 25% at the dose rate of 10 ml/kg bodyweight. Dogs were divided into group I and II with 6 animals in each group. Group I dogs were premedicated with dexmedetomidine, induced with propofol and maintained under isoflurane inhalation anaesthesia. Group II dogs were directly induced with propofol without premedication. Before premedication the dogs in group I were preoxygenated for 10 minutes and dexmedetomidine was given at the dose rate of 15 mcg/kg body weight. After premedication dogs were induced with propofol at the dose rate of 5 mg/kg body weight and maintained with isoflurane anaesthesia after intubation. The cardiopulmonary parameters were recorded at every five minutes from intubation till the extubation time. Haematobiochemical parameters were collected before, during and after the caesarean section.

The neonates delivered through CS were evaluated by Apgar score and parameters like mucous membrane colour, heart rate, respiratory rate, reflex irritability, mobility, suckling reflex, vocalization, rooting and righting reflex were recorded at 5 min to 24 h. Each parameter was assigned a value of zero, one or two based on their activity at 5 min from birth, 30 min, 60 min, 2 h and 24 h. The neonates were placed on the electrical neonatal heating blanket to avoid mortality by hypothermia. The mucous membrane colour by direct visualization rated as 2 when mucous membrane was reddish indicative of adequate respiratory activity, 1 when mucous membrane was pink indicative of slight respiratory failure and 0 when mucous membranes were cyanotic or pale indicative of acute respiratory failure.

Heart rate more than 220 beats per min (bpm) was rated as 2, between 180-220 as 1 and less than 180bpm as 0. Respiratory effort was rated as 2 when the respiratory rate was more than

15 or when clear crying was noticed, 1 when the respiratory rate was between six to fifteen or mild crying, 0 when the respiratory rate was less than 6 or no crying. Reflex irritability was not easily inducible and detectable in newborn dog, it was evaluated by gentle compression of the tip of the paw, evaluating the degree of newborn reaction. Crying and quick leg retraction was rated as 2, weak leg retraction and no or just weak localization as 1 and no leg retraction and no vocalization as 0. Mobility was evaluated by observing the strength spontaneous movement of the newborn. The strong movement was rated as 2, mild movement as 1 and weak or absent attempt of movement as 0. Suckling reflex was elicited by inserting the clean tip of the smallest digit of the examiner into the mouth of the neonates to assess the suckling force (Veronesi *et al.*, 2009). The score was rated as 2, when strong suckling was noticed (5suckles/min), 1 when weak suckling (>3 suckles/min) and 0 when the suckling was absent (Vassallo *et al.*, 2015).

Vocalization was rated as 2, when an active reaction (vigorous) was noted. 1, when a feeble reaction (weak vocalization) was observed after the stimulation 0, when no vocalization and no response to stimuli were observed. (Moon and Erb, 2001). The rooting reflex was assessed by approaching the nose of the neonate with a hand shaped into a circle with a forefinger and thumb and checking whether the neonate inserted its nose into the circle. When the newborn is immediately fitting muzzle within circle it was rated as 2, when slow muzzle is fitting into the circle as 1 and when no such activity was noticed it was rated as 0. The righting reflex of the neonate was assessed by placing newborn on its back on a soft surface and verifying that it returned to the right recumbence. The fast body repositioning was rated as 2, slow body repositioning as 1 and absent of this activity was rated as 0.

The neonates born immediately underwent resuscitation, prompt clearing of airways, blow drying of skin. The umbilical cord was ligated and cut 0.5cm to 1cm away from abdomen (Subramani *et al.*, 2017). Post operatively the dogs were given Tab. Amoxicillin at the dose rate of 20 mg/kg and Tab. Tramadol orally at the dose rate of 2 mg/kg for 7 days.

Results and Discussion

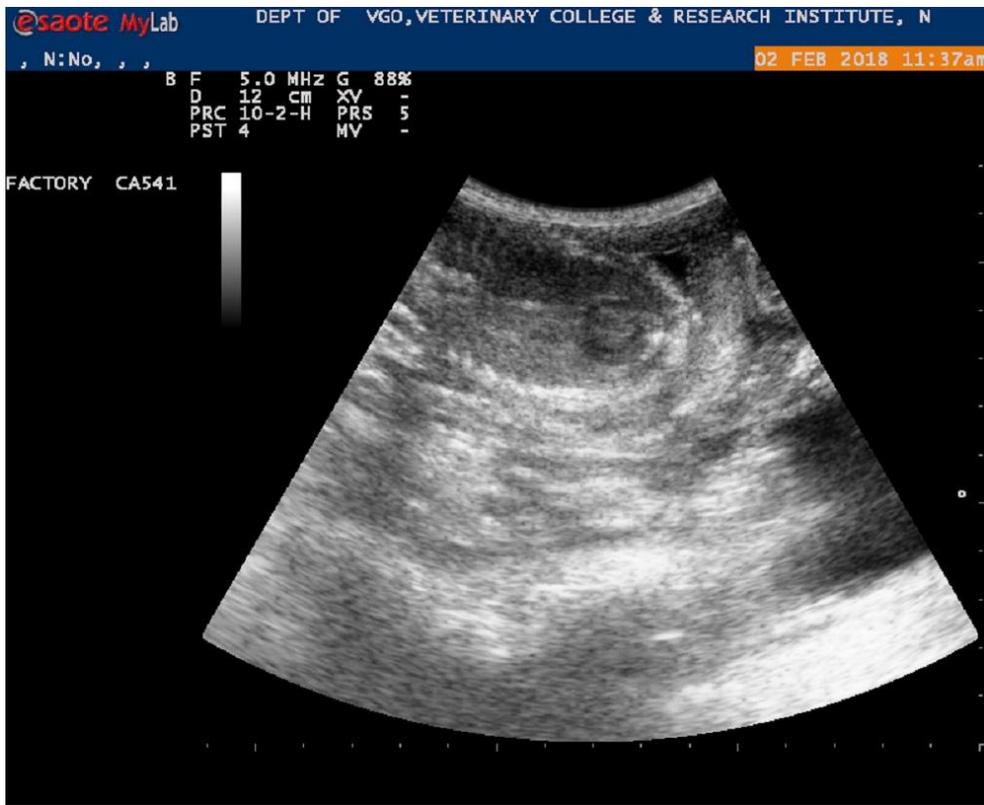
Out of all the 12 dogs presented all recovered successfully. Dexmedetomidine was proved to be excellent premedicant and pregnancy safe drug as it did not have any adverse effects on neonates. The anaesthetic protocol employed was proved safe and reliable. The dogs premedicated with dexmedetomidine showed

more muscle relaxation, no movements during surgery, reliable sedation and adequate analgesia. Out of all the 32 neonates born in group I, the no mortality was noticed at five min and 24 h after birth. And out of all the neonates born in group II, mortality was two at five min. The neonates with Apgar score less than 6 at five minutes after birth were given prompt resuscitation and the score was increased to more than 10 after 30 min. The neonates assessed with intensive care unit showed Apgar score more than 10 which included pink to reddish mucous membrane colour, heart rate more than two hundred and twenty beats per minute, higher respiratory rate more than fifteen breaths per minute, vigorous mobility, strong vocalization and suckling reflex was observed within thirty minutes from birth in all the neonates.

Parameters	Score 0	Score 1	Score 2
Mucous membrane colour (Appearance)	Cyanotic, pale	Pink	Reddish
Heart rate (BPM)	<180	180 to 220	>220
Respiratory rate (bpm)	<6	6 to 15	>15
Reflex irritability	None	Feeble reaction	Active reaction
Mobility	None	Feeble reaction	Active mobility
Suckling	None	Weak	Energetic
Vocalization	None	Mild	Vigorous
Rooting	Absent	Slow muzzle fitting inside the circle	Immediate fitting the muzzle within the circle
Righting	Absent (remains in initial position)	Slow body repositioning	Fast body repositioning

score	No. of pups in group I	No of pups in group II	Survival	Mortality	χ^2
0 to 4	0	2(9.5)	0	2(100.0)	0.003
5 to 9	0	4(19.0)	4(7.9)	0	
>10	32	15(71.5)	47(92.1)	0	
Total	32	21	51	2	

Significant at 0.05 level







MMC



Righthing



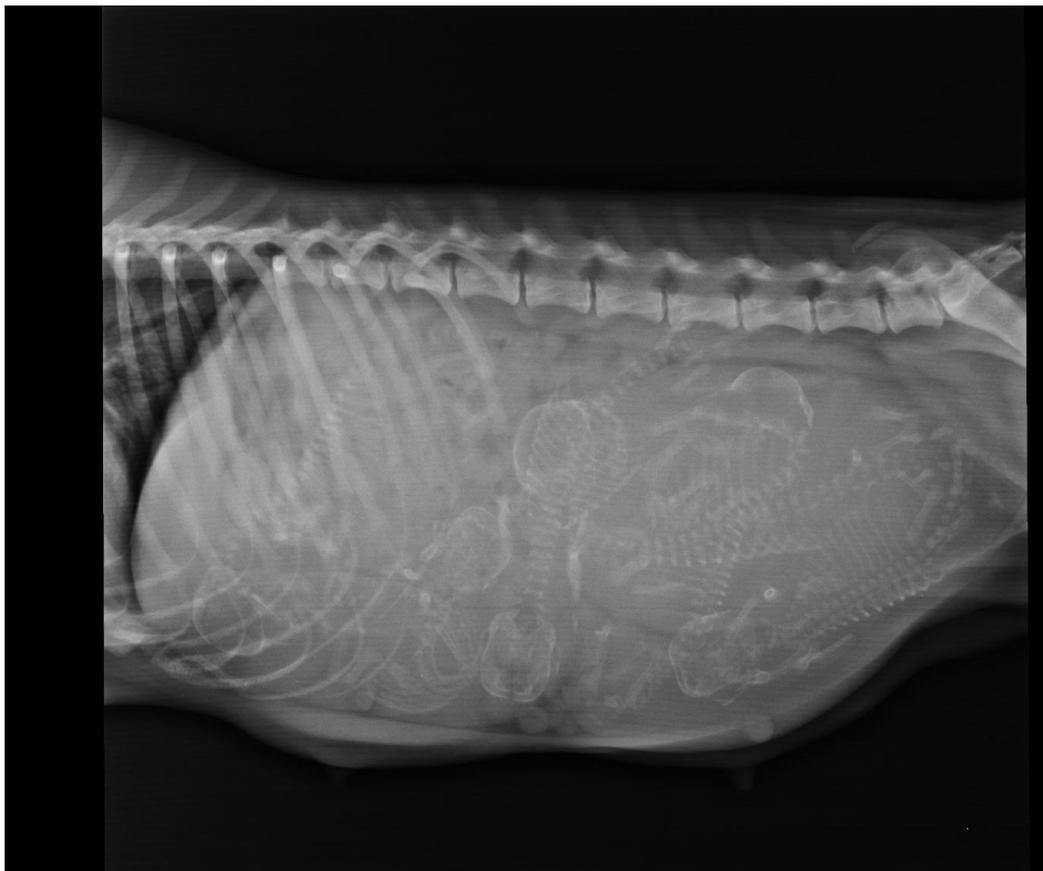
Rooting



Suckling reflex



X-Ray



Dexmedetomidine did not produce any adverse effects on cardiopulmonary system of dam as well as neonates. Apgar score was proved easy, safe, reliable and inexpensive method for neonatal assessment.

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