

NEW ANESTHETIC COMBINATION FOR EQUINE SURGERY*

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SUMMARY

Two groups each containing 5 horses of both local or half blood breed English-local with an average body weigh of 300-350 kg were used for trials. Surgical procedures applied to these horses were one castration, two cases of cryptorchidic treatment and other simple experimental anesthesia.

In first group, propionyl promazine (CombelenR) 1 ml/100 kg b.wt.i.v., and 20 g/kg in 0.2 ml/100 kg b.wt., detomidine hydrochloride (Domosedan R) was i.v. injected. After the observation of the start of sedation in 2-3 min., Guaiaicol glycerine ether (Gujatal 10 %R) at a dose of 216 ± 47.7 ml/horse, i.v. was given additionally. Horses were manageable and lied down without any forceful procedure. To prolongate the anesthesia 3 mg/kg b.wt. Ketamine hydrochloride (AescoketR) was given i.v. . The duration of anesthesia was about 99 ± 26 min. and wakening time lasted 62 ± 20 min. After controlled parameters all were considered in normal physiological limits.

In the second group, Atrophine sulfate 0.022 mg/kg b.wt. i.v., Detomidine hydrochloride (domosedan) 40 g/kg b.wt.in 0.4 ml 100 kg/b.wt. followed by Guaiaicol glycerine ether (Gujatal 10 %) at a dose of 160 ± 22.3 ml/horse i.v. were used. Again, all horses lied down with no help, and the anesthesia prolongedated by oro-tracheal intubation of Halothane in oxygen that was easily accomplished without any complication. Time deep anesthesia 63 ± 8.3 min. Controlled parameters were also falling in normal limits.

As a conclusion these anesthetic combinations were readily applicable in equine surgery, especially those procedures carried out under field conditions and takes less than an hour. They applied without any problem and forceful aids to sedate and have the subjects lied down for surgery. In addition, the duration of anesthesia can be easily prolongedated by using Detomidine hydrochloride, Ketamine hydrochloride, Guaiaicol glycerine ether or in oxygen and Halothane administration when needed.

KEY WORDS : Detomidine HCl, kethamine HCl, guaiphesin, propionyl promazine, halothane, anesthesia, horse.

At cerrahisi için yeni anestezi kombinasyonlar

ÖZET

Bu çalışmada yerli ve yarı kan İngiliz ırkında ve vücut ağırlıkları ortalaması 300-350 kg olan 10 at üzerinde çalışıldı. Bu materyal 5 er atlık iki gruba ayrıldı. Bu atlardan birisinde kastrasyon, ikisinde inguinal kriptorşidi operasyonu yapıldı. Diğer 7 atta ise deneysel olarak anestezi uygulamaları gerçekleştirildi.

1. Grup: Propionyl promazine (Combelen) 1 ml/100 kg can.ağr., 20 g/kg veya 0.2 ml/100 kg can.ağr. detomidine hidroklorid (Domosedan) i.v. olarak enjekte edildi. Sedasyon bulgularının gözlenmesini takiben, Guaiaicol glycerine ether (Gujatal % 10) 216 ± 47.7 ml/at dozunda i.v. olarak uygulandı. Bu uygulama ile atlar başlıktan ve kuyruğundan destekleyen yardımcı araçlarıyla başkaca bir yardıma gerek kalmadan yatırıldılar. Ketamin HCL (Aescoket) 3 mg/kg i.ö. olarak verildi. Anestezi süresi 99 ± 26 dk., uyanma ve ayağa kalkma süresi ise 62 ± 20 dk. olarak saptandı. Kontrol edilen parametreler normal fizyolojik limitleri içerisinde bulundu.

2. Grup: Atropin sülfat 0.022 mg/kg can.ağr. i.v., detomidine hidroklorid (Domosedan) 40 g/kg veya 0.4 ml/100 kg i.v. olarak uygulandı. Sedasyon bulgularının saptanması sonrasında Guaiaicol glycerine ether (Gujatal % 10) 160 ± 22.3 ml/at dozda i.v. olarak verildi. Bu gruptaki atlarda bu uygulama ile herhangi bir yardım olmaksızın yatırıldılar. Anestezinin devamlılığı, bu grup atların orotracheal entübasyonu sonrası, halotan ve oksijen karışımı ile sağlandı ve herhangi bir komplikasyonla karşılaşılma. Anestezi süresi 63 ± 23 dk., uyanma ve ayağa kalkma süresi ise 68 ± 8.3 dk. olarak saptandı. Bu gruptaki atlarda da kontrol edilen parametreler normal fizyolojik limitleri içerisinde bulundu.

Sonuç olarak bu kombinasyonların özellikle atlar için saha koşullarında ve bir saatlik uygulamalar için pratik ve emin olarak uygulanabileceği anlaşılmıştır. Anestezi süresini uzatmak için detomidine hidroklorid, guaiaicol glycerine eter, oksijen ve halotan kombinasyonlarının ihtiyaç doğrultusunda ilave dozlarının kullanılması gerekmektedir.

ANAHTAR KELİMELER : Detomidine HCl, Ketamine HCl, guaiphenesin, propionyl promazine, halothane, anestezi, at.

INTRODUCTION

The veterinary practitioners need for effective sedation and analgesia of horses is emphasized by the strength and temperament of the species. One of the problems associated with equine anesthesia is the selection of medications to be used for anesthesia for standing procedures or for prolonged surgical procedures requiring injectable medications rather than inhalant anesthetic approach (29). Observations of the responses in horses to a new analgetic and sedative injectable detomidine hydrochloride showed profound relaxation and analgesia (1, 2, 4, 8, 10, 11, 16, 18, 19, 20, 24, 25, 26, 31). Various combinations have been tried with detomidine hydrochloride; butorphanol (5, 30), morphine (5), pethidine (5), methadone (5), xylazine (7, 21) ketamine (9). The use of Guaiaicol glycerine ether as a myoralaxant agent in the horse in combination with intravenous (6, 12, 13, 14, 22, 23, 32) or inhalation anesthetic agents (3, 12, 15, 17, 23, 32) has

been widely reported.

This paper describes the use of detomidine hydrochloride in combination with Guaiaicol glycerine ether, propionyl promazine and atrophine sulphate as an induction techniques before inhalant anesthesia and the use of detomidine hydrochloride in combination Guaiaicol glycerine ether and ketamine hydrochloride as a dissociative anesthesia in the field condition.

MATERIALS and METHODS

A total of 10 anesthesia were achieved in ten horses standard and halfbreed of both sexes. An average body weight of these materials were 300-350 kg. Different surgical procedures applied to these horses were 1 castration, 2 inguinal cryptorchid operation and others simple experimental anesthesia.

Two different methods of anesthesia were used and the horses were divided in two groups in accordance to this.

Group 1: Consisted of 5 horses, receiving propionyl promazine

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Table 1. Premedication, Anesthesia, Surgery Group 1 (n=5)

Premedication	Doses	Gen. Anesth.	Doses	Kind of Operation
Propionyl Promazine (Combelen)	1 ml/100 kg i.v.	Ketamine hydrochloride (Aescoket)	3 mg/kg i.v.	Castration Inguinal cryptorchdy
Detomidine hydrochloride (Domosedan)	20 µg/kg 0.2 ml/100 kg i.v.			
Guaiacol glycerine ether (Gujatal 10 %)	216 ± 47.7 ml i.v.			Exp. anesthesia Exp. anesthesia Exp. anesthesia

(Combelen, Bayer-Leverkusen, Germany) as a preanesthetic at a dosage level of 1 ml/100 kg b.wt. intravenously and detomidine hydrochloride (Domosedan, Farnos Ltd. Turku, Finland) at a dosage level 20 µg/kg or 0.2 ml/100 kg b. wt. intravenously. After has been shown of the sedative effects Guaiacol glycerine ether Guifenesine (Gujatal 10 %, Aesculaap Vet. Prodc. The Netherlands) at a dosage level 100 mg/kg b.wt. intravenously infused. Horses were manageable and lied down at lateral recumbency position without any forceful procedure. After 5 min. ketamine hydrochloride (Aescoket, Aesculaap Vet. Prodc.-The Netherlands) as an anesthetic at a dosage level 3 mg/kg b.wt. administered intravenously (Table 1).

Group 2.: Consisted of 5 horses receiving an intravenously atropine sulphate (Vetaş, İstanbul-Turkey) 0.022 mg/kg b.wt. and detomidine hydrochloride for premedication at a dosage level 40 µg/kg or 0.4 ml/100 kg b.wt. ± After has been shown of the sedative effects Guaiacol glycerine ether-Guaifenesin infused intravenously at a dosage level 100 mg/kg b.wt. . The horses were lied down lateral recumbency similar in first group.

Once recumbent the horses were intubated with a cuffed endotracheal tube and connected closed anesthesia apparatus (Narkovet-E, Dragerwerk-Germany) with a maximal vaporizer setting of 5 percent (Halothane, DIF-İstanbul, Turkey) and the anesthesia was maintained with halothane in oxygen (Table 2).

During anesthesia the patients pulse rate, respiratory rate and body temperature (rectal route) were recorded at intervals of 15 th minutes. At the same time direct arterial pressure (from a facialis) arterial pH, arterial PaO₂ and Pa CO₂ levels were recorded. The dura-

tion of anesthesia, recovery and standing times were also recorded.

RESULTS

During the induction phase, the horses were restrained by and assistant holding a head strap and another one supporting the hind quarters by holding the tail.

The sedative effects of detomidine hydrochloride made the horse quickly calm and somnolent after 2-3 min. after administration. The head dropped near the floor, in addition the lips drooped and the tongue hung outside the mouth. The eyelids were half shut. After Guaiacol glycerine ether-guaifenesin infused the carpal and tarsal joints were flexed and horses were manageable and lied down without any forceful procedure at two groups.

The quality of anesthesia was good. The quality of recovery was considered to be good in both groups with the horses rolling first to sternal recumbency for a few minutes before standing up.

The controlled parameters, duration of anesthesia, recovery and standing time were showed (Table 3, 4, 5).

Table 3. The mean duration of anesthesia and mean time taken to resume the standing position

	Gr. 1	Gr. 2
Anesthesia time (min.)	99 ± 26	63 ± 23
Standing time (min.)	62 ± 20.7	68 ± 8.3

Table 2. Premedication, Anesthesia, Surgery Group 2 (n=5)

Premedication	Doses	Gen. Anesth.	Doses	Kind of Operation
Atropine sulphate	0.022 mg/kg i.v.	Halothane +	5 % 5 min +	Inguinal cryptorchdy Exp. anesthesia Exp. anesthesia Exp. anesthesia
Detomidine hydrochloride (Domosedan)	40 µg/kg 0.4 ml/100 kg i.v.			
Guaiacol glycerine ether (Gujatal 10 %)	160 ± 22.3 ml i.v.		1.5-2.5 % 3-4 lt/min	Exp. anesthesia

Table 4. Controlled parameters of Group 1 (n=5)

Parameters	Control Intervals					Mean
	0'	15'	30'	45'	60'	
Body temperature, C°	37.8 ± 0.3	37.7 ± 0.1	37.7 ± 0.1	37.1 ± 0.2	36.7 ± 0.1	37.4 ± 0.4
Pulsation rate, min	66 ± 7.6	76 ± 15	63 ± 4.4	54 ± 6.9	50 ± 8.4	61.8 ± 10.2
Respiratory rate, min	12 ± 1.6	17 ± 1.1	14 ± 1.6	15 ± 3	13 ± 3	14.2 ± 1.9
AP (Direct), mmHg	87.25 ± 6.07	93.00 ± 7.77	85.00 ± 5.77	80.75 ± 11.0	71.3 ± 2.3	84.13 ± 9.1
Hematocrit, %	24.25 ± 7.5	23.00 ± 1.0	22.6 ± 2.8	17.00 ± 2.6	23.5 ± 4.9	22.07 ± 2.9
Hemoglobin, g	9.2 ± 2.5	8.8 ± 1.8	7.9 ± 1.6	6.8 ± 1.5	8.2 ± 1.0	8.18 ± 0.9
Arterial pH	7.385 ± 0.02	7.400 ± 0.02	7.380 ± 0.03	7.380 ± 4.2	-	7.380 ± 0.01
PaCO ₂ , mmHg	45.75 ± 2.6	43.65 ± 0.7	49.20 ± 1.4	29.90 ± 20.5	-	42.12 ± 8.4
PaO ₂ , mmHg	84.90 ± 22.7	150.15 ± 18.4	91.80 ± 48.9	134.75 ± 3.0	-	115.4 ± 31.9

Table 5. Controlled parameters of Group 2 (n=5)

Parameters	Control Intervals					Mean
	0'	15'	30'	45'	60'	
Body temperature, C°	37.7±0.4	37.3±0.1	37.4±0.5	37.1±0.5	36.9±0.6	37.2±0.3
Pulsation rate, min	61.5±11.8	62.4±19.9	62.4±18.8	59.4±12.4	58.0±7.6	60.7±1.9
Respiratory rate, min	14.2±1.7	16.8±4.3	19.0±5.3	16.6±5.1	16.0±5.8	16.52±1.7
AP (Direct), mmHg	99.2±15.8	102.0±15.5	105.6±20.7	100.2±20.1	116.0±21.1	104.6±6.8
Hematocrit, %	24.2±2.9	24.2±2.6	23.4±4.1	23.4±4.3	24.4±3.9	23.9±0.4
Hemoglobin, g	9.44±2.6	8.64±0.5	8.0±1.2	7.7±1.2	8.4±1.2	8.43±0.6
Arterial pH	7.39±0.03	7.41±0.02	7.40±0.04	7.37±0.04	7.41±0.02	7.39±0.01
PaCO ₂ , mmHg	39.98±18.9	47.95±5.7	48.52±8.34	43.30±3.25	48.20±10.5	45.59±3.7
PaO ₂ , mmHg	89.32±17.9	80.47±20.7	111.52±60.3	111.4±65.4	63.1±2.8	91.16±20.7

DISCUSSION

A new drug detomidine hydrochloride is a potent alpha-adrenergic agonist with sedative and analgetic properties. It has been found to produce prolonged analgesia and a deeper stage of sedation (1, 2, 4, 8, 24, 26, 29, 31). Guaiacol glycerine ether-Guaifenesin is a more potent muscular relaxant agent in horses (6,12,13,14, 22, 32). Generally, anesthetic induction was made with an ultrashort acting barbiturate and muscle relaxant agent (1, 3, 12, 17, 23, 32). Short et. al (28) tried detomidine hydrochloride especially 20 g/kg i.v. doses level and showed duration of analgesia and sedation was 60 min. We used 40 g/kg i.v. detomidine hydrochloride with guaiacol glycerine ether combination in our study and did not need barbiturate injection for intubated at the second group. Premedication with detomidine hydrochloride and administration of ketamine procedure a satisfactory anesthesia, with high quality recovery for short term surgical procedure (9, 29). Our study has been showed similar results.

CONCLUSION

As a conclusion these anesthetic combinations were rapidly applicable in equine surgery, especially those procedures carried out under field conditions an takes less than an hour. They applied without any problem and forceful aids to sedate and have the subjects lied down for surgery. In addition, the duration of anesthesia can be easily prolonged by using detomidine hydrochloride, ketamine hydrochloride, guaiacol glycerine ether and halothane in oxygen administration when needed.

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1994 YILI BAKANLIK ARAŞTIRMA GRUP TOPLANTILARI...

TARIM VE KÖYİŞLERİ BAKANLIĞI TARIMSAL ARAŞTIRMALAR GENEL MÜDÜRLÜĞÜ İslah ve Yetiştirme Araştırmaları Dairesi Başkanlığı 1994 YILI ÇALIŞMA GRUP TOPLANTILARI PROGRAMI

Toplantı Adı :	Toplantı Tarihi :	Toplantı Yeri :
1- Büyükbaş Hayvancılık	1-4 Şubat 1994	Çukurova Tar. Arş.Enst. ADANA
2- Endüstri Bitkileri	8-11 Şubat 1994	Pamuk Arş. Enst., Nazilli/AYDIN
3- Örtüaltı ve Açıkta Sebze	8-11 Şubat 1994	Bahçe Kült. Arş. Enst., Erdemli/İÇEL
4- Serin İklim Tahılları, Çeltik	21-25 Mart 1994	Tarla Bitkileri Merk. A.E., Lodumlu/ANKARA
5- Mısır, II. Ürün(Soya, Yerfıstığı, Susam), Ayçiçeği, Aspir, Kolza,	21-25 Şubat 1994	Akdeniz Tar. Arş. Enst., ANTALYA
6- Yemelik Dane Baklagiller, Yem Bitkileri, Çayır-Mer'a	21-24 Mart 1994	Çukurova Tar. Arş. Enst., ADANA
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8- Meyvecilik	21-25 Mart 1994	Atatürk Bah. Kült. Merk. A.E., Yalova/İSTANBUL
9- Su Ürünleri	29-31 Mart 194	Su Ürünleri Üretme İst., Kepez/ANTALYA
10- Bağcılık	29-31 Mart 1994	Bağcılık Arş. Enst., TEKİRDAĞ
11- Küçükbaş Hayvancılık	29-31 Mart 1994	Hayvancılık Merk. Arş. Enst., KONYA
12- Gen. Kaynakları, İtri-Tıbbi Bitkiler, Süs Bitkileri	29-31 Mart 1994	Ege Tar. Arş. Enst., Menemen/İZMİR
13- Zeytincilik	29-31 Mart 1994	Zeytincilik Arş. Enst., Bornova/İZMİR
14- İpekböceği, Arıcılık, Tavşancılık	4-6 Nisan 1994	Ege Tar. Arş. Enst., Menemen/İZMİR
15- Turunçgil ve Diğer Subtropik Bitkiler	4-7 Nisan 1994	Narenciye Arş. Enst., ANTALYA