

## COMPARATIVE EVALUATION OF OPEN-CLOSE METHOD OF CASTRATION WITH AND WITHOUT SUTURING OF THE SCROTAL WOUND: A REPORT OF 12 CASES

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**Abstract:** Twelve clinically healthy horses were divided into two groups, Group I- Open-close method of castration followed by skin suturing (n-6) and Group II- open-close method of castration without skin suturing (n-6). Minimum post-operative complications and early healing was observed in the horses belonging to group I as compare to group II.

**Keywords:** Castration, close method, wound healing.

### Introduction

Castration is the most commonly performed surgical procedure in the horse. The most common reason for castration is that the horse is not going to be used for breeding purposes or to prevent behavioral problems. The benefits of castration in stallion are that the horse can then be placed with mares and/or geldings, and is easier to handle (Lenz, 2009). Castration can be performed in either standing or recumbent animal. There are many techniques used for the castration of equine like open method, closed method, semi-closed technique and Section-Ligation-Release (SLR) technique (Saifzadeh, et al., 2008). Most horses are castrated in the field using either a closed or open castration technique that leaves the scrotal incision(s) open to heal by second intention. Irrespective of the chosen technique, the incidence of castration-related complications is generally regarded as low (Baird and Wolfe, 1998).

Complications that can arise following surgical castration include scrotal swelling or oedema, excessive post-operative haemorrhage, infection, hydrocele, schirrous cord, peritonitis, penile trauma, omental herniation and eventration (Moll et al., 1995). Evisceration typically occurs within the first 4 h of castration, although intestinal eviceration has been reported up to 6 days after surgery (Boussauw and Wilderjans, 1996). Obligate wound healing by second intention is common to many techniques for castrating horses. Castration sites need to heal from the inside out. If the outside skin heals first, serum and blood can

accumulate in a pocket and the site will become infected. To overcome complications that accompany traditional castration techniques researchers have experimented with primary closure of the castration wound to attain first intention healing. Post-operative care after the surgery is extremely important, especially if the skin incision is left open to heal on their own.

## **Materials & Methods**

### **Pre-Operative Preparation**

Horses were administered perioperative Tetanus toxoid and Fenbendazole (3gm p.o.) as deworming just before 24 prior to surgery. All the horses were premedicated with phenylbutazone (2.5 mg/kg PO) as analgesic and Benzylpenicilline (12000 IU/kg) + Gentamicin (6 mg/kg) combination as antibiotic just 30 minutes prior to surgery.

All the horses were pre-surgically evaluated by various physiological parameter like Heart rate, Respiration rate, Pulse rate, Mucous membrane color. Various hematological parameters were also evaluated like CBC, BUN, Creatinine, AST, ALT.

### **Anesthesia & Restrain**

For all the horses, feed was withheld for 24 hours and water for 12 hours prior to anaesthetic induction. All the horses were premedicated with Xylazine (1.1 mg/kg body weight) i.v. After complete sedation was achieved, horse was restrtained by sideline technique. Approximately, seven minute after administration of preanaesthetic; the anaesthesia was induced by Ketamine hydrochloride (2.2 mg/kg body weight) i.v., to the effect. If adequate sedation was not achieved after Xylazine then Diazepam (0.033 mg/kg body weight) i.v., was given in addition to Ketamine hydrochloride. The spermatic cords were desensitized by directly injecting Lignocaine hydrochloride, to block the spermatic nerve. Maintenance of anaesthesia was done by using Xylazine (0.5 mg/kg) and Ketamine hydrochloride (1.1 mg/kg) combination approximately 20 minute after initial dosages.

### **Surgical technique**

An incision was made through the scrotal skin, tunica dartos and scrotal fascia parallel to the median raphae, approximately 2 cm apart and 8 to 10 cm long (fig.1). In the closed method, the parietal tunic was not incised (fig.2), so that it could also be removed along with the testicle and a portion of the cord. Using digital dissection, the parietal tunic surrounding the testicle was freed of the scrotal fascia, and by placing traction on the testicle with one hand, the parietal tunic of the cord was separated from spermatic fascia with another hand (fig. 3). Once the parietal tunic was separated from the surrounding fascia, it was removed along with

its contents using a castration clamp and transfixation of the spermatic cord using Catgut No. 2 (fig.4). In all the cases, spermatic cord was incised 2 cm below the ligature and testes were removed distal to the ligature (fig.5). After removal of the testes, In group-I (n=6), scrotal skin was closed by retention suture using nonabsorbable surgical suture material (fig.6) while rest of the six horses belonging to group-II (n=6), the scrotal skin was kept open following castration (fig.7).

### **Post-operative care**

The surgical wound was cleaned with Povidone iodine solution. Inj. Phenylbutazone (2.5 mg/kg b.w.) was administered for 5 days, i.m., s.i.d., Inj. Benzylpenicilline (12000 IU/kg b. w.) was administered daily for 5 days, i.v., with the combination of Inj. Gentamicin (6 mg/kg b. w.), i.v., once daily. The skin sutures were removed between 7th and 10th postoperative day based on wound healing. In case of open wound, daily antiseptic dressing was carried out by using 5% povidone iodine solution until healing.

### **Results & Discussion**

All the six horses belonging to group I were castrated by open-close method of castration followed by skin suture at the age ranging from 1.6 to 8 years with a mean age of  $5.76 \pm 1.03$  years. The horses weighed 360 to 432 kg with a mean body weight of  $398 \pm 11.76$  kg. The group included 6 Kathiawadi horses. Tunica vaginalis was kept intact in all the horses of this group but the scrotal skin wound was sutured by horizontal mattress pattern using silk thread (Vadalia et al., 2012).

Complete wound healing was observed in 8 days in almost all the horses of this group except in one horse, which took 13 days for complete wound healing. Most of the animals recovered without any complications. In the present clinical study, one horse developed postoperative haematoma. This might be due to improper ligation of the spermatic cord (Vadalia et al., 2012).

All the six horses belonging to group II were castrated by open-close method of castration without skin suture at the age ranging from 2 to 7 years with a mean age of  $4.61 \pm 0.93$  years. The horses weighed 350 to 441 kg with a mean body weight of  $394.83 \pm 15.56$  kg. Similar method of castration was used by Rutgers and Merkens (1983). They castrated 497 horses and ponies using this technique. The group included 5 Kathiawadi and 1 nondescript horses. In the closed technique, the parietal tunic was not incised so that it could also be removed along with the testicle and a portion of the cord. In all the cases, spermatic cord was incised 2 cm below the ligature and testes were removed distal to the ligature (Shoemaker et al., 2004).

Although the most serious postoperative complications such as intestinal eventration and haemorrhage of the spermatic cord may be reduced to a minimum by this approach. In the present study, oozing of blood was seen up to 20 minutes postoperatively in a horse which then subsequently ceased automatically without any aid. Postoperative haemorrhage might be due to the improper ligation of the spermatic cord. Additionally, possibility of temporary reactionary secondary haemorrhage could not be excluded as it is very common following excision of highly vascularized soft tissues (Pleasant, 1999).

### **Post-operative evaluation**

Routine clinical evaluation was carried out at periodical intervals by observing the site for swelling, by recording rectal temperature and recording wound healing time in all the horses belonging to group I and II.

### **Swelling:**

In the horses belonging to group I and II, severe degree of swelling was observed in 1 (8.33 %) out of 12 horses on the 2nd postoperative day. In group I, out of the 6 horses, 1 (16.66 %) horse showed severe degree of swelling at the site of incision (fig.8). In group II, out of the 6 horses, no any evidence of swelling was observed at the site of incision. Clinically, major difference was not seen in group IIA, group IIB. Swelling was not observed in Group II. This might be due to the intact tunica vaginalis and proper drainage of wound.

### **Wound healing time:**

Clinical wound healing was complete after approximately 10-12 days following castration in Group-I and Group-II horses. Complete wound healing time was 7 days in 5 (83.33 %) horses out of 6 horses in group I. Whereas, 1 (16.66%) horse out of 6 horses took additional 5 days' time for complete wound healing. This might be due the postoperative hematoma formation in these horses. Complete wound healing time was 10 days in all horses in group II and all the horses were recovered without any complication (Parsania et al., 1999).

However, individually it was observed that the horses which underwent castration wherein the tunica vaginalis was kept intact with scrotal suturing remained advantageous as this might have prevented either normograde or retrograde entry of infections which intern could have reduced the chances of complications and hence the wounds in these animals might have healed comparatively earlier than the horses in which the tunics were opened during gelding procedure (Vadalía et al., 2012).

The findings of the present study are suggestive of the fact that open-close method of castration followed by scrotal wound suturing and open-close method of castration without

skin suture showed minimum complications following castration. In both these methods, tunica vaginalis was kept intact. Intact tunica vaginalis might have prevented normograde or retrograde entry of exudation and possibility of infection which might have prevented the complications (Shoemaker et al., 2004). Early healing was observed in group I (7 days) as compare to group II (10 days).

### **Haemorrhage**

Postoperative haemorrhage was observed in 1 (8.33 %) of the 12 horses. In group I, out of the 6 horses, 1 (16.66 %) horse showed postoperative haemorrhage (fig.8). In the present study, the postoperative haemorrhage might be due to the improper ligation of the spermatic cord (Vadalia et al. 2012). In a horse castrated by open-close method of castration followed by skin suture, haemorrhage was found postoperatively which then led to formation of haematoma. After 5 postoperative days, a stab incision was given on haematoma and accumulated blood clots were removed manually by applying gentle pressure on haematoma. Postoperative antibiotic and antinflammatory drugs could control the postoperative infections and other complications in this case. It took additional 5 day time for healing of surgical wound as compared to the other horses of group IIB (May and Moli, 2002)

### **Suture line infection**

Postoperative suture line infection was observed in 1 (8.33 %) of the 12 horses. In group I, out of the 6 horses, 1 (16.66 %) horses showed suture line infection. There was wound dehiscence which was treated as open wound up to complete healing (fig.9). In the present study, it might have occurred due to the humid environment as most of the horses of this group were castrated in monsoon and winter season (Searle et al., 1999). The entire infected wound was treated by antiseptic dressing with the use of povidone iodine solution (5%) and antibiotics postoperatively. It took additional 5 days' time for healing of surgical wounds as compared to the other horses of group I (Parsania et al., 1999).

### **Conclusion**

Keeping the tunica vaginalis intact followed by scrotal wound suturing during the procedure of castration reduced the overall postoperative complications. Open-close method of castration followed by scrotal skin suturing remained comparatively complication free and the horses recovered within optimal time and early wound healing was observed postoperatively as compare to open-close method without skin suturing.

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Fig. 1 skin incision



Fig. 2 Testis with Tunica vaginalis



Fig. 3 Separation from dartose muscle

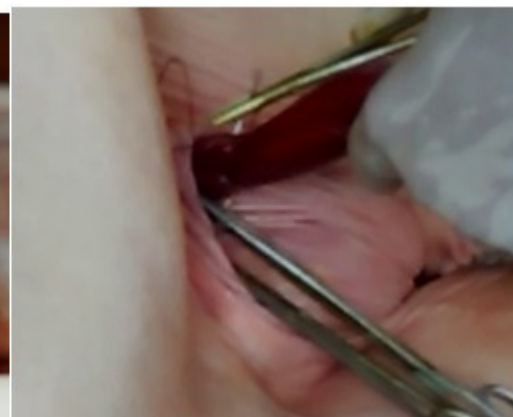


Fig. 4 Trans-fixation of spermatic cord



Fig. 5 Cutting of spermatic cord



Fig. 6 sutured scrotal wound



Fig. 7 Open scrotal wound

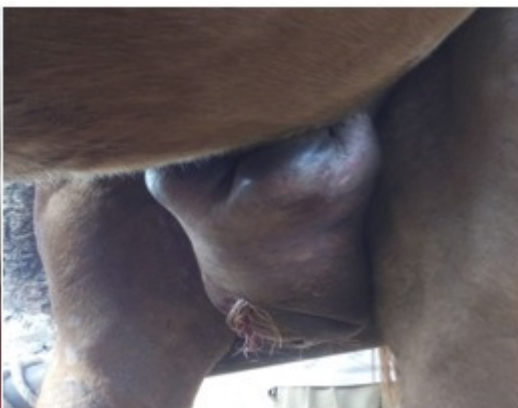


Fig. 8 Post-operative hemorrhage



Fig. 9 Suture line infection