

Surgical treatment of a unilateral scrotal hernia in a ram - a case report

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ABSTRACT

An 8-year-old German Merino (Merinolandschaf) ram suffered from abnormal fluid-filled scrotal swelling was presented at the Clinic of Surgery, Orthopaedics and Ophthalmology at the Faculty of Veterinary Medicine in Zagreb. The ram had been used for breeding and group-housed with other sheep. The first signs of scrotal swelling had been noticed several months earlier. The swelling had been enlarging gradually, and then stopped about one month prior to referral at the Clinic. Physical examination revealed an abnormally enlarged, asymmetric and moderately painful scrotum. It was the size and shape of a rugby ball, with the left side approximately several times as large as the right. The hernial content included loops of small intestine and atrophied testicle, surrounded by large amount of fluid. Surgical procedure comprising herniotomy, herniorrhaphy and unilateral orchiectomy of the left side of the scrotum was performed under general anaesthesia. A firm mass the size of a palm, filled with blood clots, was found inside the spermatic cord. The left testicle and pathological mass were surgically removed, while the right testicle was preserved at the owner's request. The wound healed without complications and the ram was returned successfully to reproduction.

Key words: scrotal hernia, herniotomy, ram

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Introduction

Scrotal hernia is a rare disorder in small ruminants (ROBERTS, 1988). It forms as an extension of inguinal hernia, when the abdominal organs protrude through an enlarged inguinal ring into the scrotum (AL-SOBAYIL and AHMED, 2007). Available references have described unilateral scrotal hernia in rams and male lambs of the Merino (CARR, 1972), Hampshire (BRAUN and COLE, 1985; ROBERTS, 1988) and Suffolk breeds (AHMAD et al., 2000), and in the Arabic Naimi breed (AL-SOBAYIL and AHMED, 2007). Inguinal hernia has also been described in two ewes (WEAVER, 1968).

In most cases, scrotal hernia is acquired, usually caused by a trauma such as a horn injury in group-housed males. However, DENNIS and LEIPOLD (1968) described two congenital scrotal hernias in lambs found at necropsy. According to BRAUN and COLE (1985), the heritability of scrotal hernia has not yet fully understood. On the other hand, CARR (1972) assumed that, due to inbreeding, Merino rams may be genetically predisposed to the development of scrotal hernia as a result of an inherited failure (i.e. an enlarged inguinal ring) which is recessive in nature (ROBERTS, 1988). Nevertheless, most experts agree that an enlarged inguinal ring is a hereditary failure, so an affected ram and its siblings should not be used in breeding (SMITH, 2006).

In addition to physical examination, plain or contrast radiography and trans-scrotal ultrasonography can be used in the diagnosis of scrotal hernia in sheep and goats (AHMAD et al., 2000; ABDIN-BEY and RAMADAN, 2001).

Surgical repair of scrotal hernia provides satisfactory treatment (ORR, 1956; CARR, 1972; BRAUN and COLE, 1985; ROBERTS, 1988; AL-SOBAYIL and AHMED, 2007), with good, uncomplicated healing (AL-SOBAYIL and AHMED, 2007). Unilateral orchiectomy of an affected testicle is recommended for the preservation of the reproductive function of the contralateral non-affected testicle (GILBERT and FUBINI, 2004; AL-SOBAYIL and AHMED, 2007), as well as for the prevention of reherniation or seroma formation. However, an affected testicle was successfully restored after the surgical repair of a scrotal hernia without orchiectomy in one male lamb (BRAUN and COLE, 1985). Postoperative care should include careful monitoring by contrast radiography (ABDIN-BEY and RAMADAN, 2001).

This report describes the first case of scrotal hernia in a ram treated at the Clinic of Surgery, Orthopaedics and Ophthalmology of the Faculty of Veterinary Medicine in Zagreb. This is also the first case ever described in a German Merino (Merinolandschaf) ram.

Case history

An 8-year-old German Merino (Merinolandschaf) ram suffered from abnormal fluid-filled scrotal swelling of a scrotum was presented at the Clinic of Surgery, Orthopaedics

and Ophthalmology at Faculty of Veterinary Medicine in Zagreb. The body mass of the ram was 85 kg. The ram had been using for breeding and group-housed with other sheep. A swelling in the scrotal region had been first noticed several months earlier. It had been enlarging slowly, and then stopped about one month prior to Clinic referral.

Clinical findings. Physical examination revealed an abnormally enlarged, asymmetric and moderately painful scrotum, which stretched down to the distal third of the metatarsus. The scrotum was the size of a rugby ball (Fig. 1). The left side of the scrotum appeared several times larger than the right.

For further examination, the ram was sedated with an intramuscular (i/m) administration of xylazine hydrochloride (Xylapan[®], Vetoquinol AG, Belp, Switzerland), at a dosage of 0.1 mg/kg of body mass (b.m.) and restrained in dorsal recumbency. On palpation, the left inguinal ring was abnormally enlarged (9 × 4.5 cm in size). On the affected side of the scrotum, small intestine loops and atrophied testicle surrounded by a large amount of fluid were palpated inside the vaginal cavity.

Further testing was not performed, at the owner's request. Therefore, radiography, ultrasonography and blood analysis were omitted.

Surgery. Food was withheld for 18 hours and water for 12 hours prior to surgery. The ram was sedated with xylazine hydrochloride (Xylapan[®], Vetoquinol AG, Belp, Switzerland), administered i/m at a dosage of 0.1 mg/kg b.m. A venous catheter was placed in the cephalic vein for the induction of anaesthesia, a continuous infusion of saline solution during the surgery, and subsequent drug administration. Anaesthesia was induced with 4 mg/kg b.m. of propofol (Diprivan[®], AstraZeneca Pharmaceuticals LP, Italy), administered intravenously (i/v). The ram was intubated and volatile anaesthesia was applied. For the first 5 minutes a 3% mixture of halothane and oxygen was used, and for the rest of the procedure anaesthesia was maintained with 1.5% halothane in oxygen. Local analgesia was achieved with 8 mL of lidocaine (Lidokain[®] 2%, Belupo, Croatia; 1 mL/5 kg b.m.) administered epidurally in the lumbosacral space. The ram was restrained in dorsal recumbency (Fig. 1) and the surgical field was prepared in the standard manner.

A modification of a technique described by GILBERT and FUBINI (2004) was used for the surgical repair of the scrotal hernia in the ram. The skin with subcutaneous tissue was incised paramedially above the left inguinal canal, and the incision was extended distally along the affected side of the scrotum for a total length of 50 cm. The tunica dartos and scrotal fascia were also incised and the hernial sac (i.e. tunica vaginalis communis) with its contents was exposed. The vaginal tunic was bluntly, but carefully dissected. Small intestine loops, spermatic cord and testicle surrounded by a large amount of fluid were observed through the extremely thickened wall of the vaginal tunic. The bowel was replaced in the abdomen through the enlarged inguinal ring by torsion of the hernial sac



Fig. 1. Ram showing a unilateral swelling of the left side of the scrotum



Fig. 2. Evacuation of fluid (centesis of the hernial sac)



Fig. 3. Blood clot found inside the vein of spermatic cord

and manually pushed over the hernial sac. Centesis was carried out by puncturing the hernial sac in the ventral portion (Fig. 2). Only part of the fluid was evacuated, so the puncture wound was extended using a sharp, 2 cm-long incision to remove the remaining fluid. A total amount of 3 litres of clear, yellowish, odourless, and serous fluid ran out through the incision.

Palpation of the hernial sac was repeated after the fluid removal. A hard, firm mass the size of a palm inside the spermatic cord was revealed above the testicle. To identify the nature of the mass (i.e. tumour, abscess or cyst), the hernial sac was opened along about 40 cm of its length.

The hernial sac was double ligated with polyglycolic acid, PGA (Dexon® Davis-Geck, England), diameter 2 (United States Pharmacopoeia, USP) suture. Transfixation suture (ligature) was placed proximally and a circumferential ligature was placed distally around the hernial sac and through the spermatic cord at its most proximal section. Afterwards, the vaginal tunic and spermatic cord with the testicle and its envelopes were transected distally from the circumferential ligature. The enlarged inguinal ring was closed using a simple, interrupted pattern using PGA (Dexon®, Davis-Geck, England) diameter 2 USP. The excess skin on the left side of the scrotum was removed. The skin and subcutaneous

tissue were closed as separate layers. The subcutaneous tissue was sutured using the Kirschner continuous pattern using polydioxanone (PDS[®], Ethicon, UK), diameter 2-0 USP. The skin wound was closed using a simple interrupted suture with silk suture (Silk[®], Ethicon, UK) diameter 2 USP, leaving an opening at the ventral portion. Gauze was placed through the opening to permit wound drainage. At the owner's request, the surgical repair procedure of unilateral orchiectomy was performed, with the aim of preserving the non-affected part of the scrotum and the remaining testicle.

Postoperative analgesia was maintained with ketoprofen (Ketofen[®] 10%, Merial, France) at a dose of 1 mg/kg b.m., administered subcutaneously (s/c).

After surgery, a gross examination and dissection of the exteriorised testicle were carried out. Only mild atrophy of the testicle, without gross evidence of damage upon section, was found. The plexus of veins inside the spermatic cord was filled with foliate-like clots. The biggest clot-containing mass was the size of a palm (Fig. 3).

Postoperative care consisted of 5 days of treatment with a combination of 250.000 IU/mL of procaine-benzylpenicillin and 250 mg/mL of dihydrostreptomycin (Sustrepen[®], Veterina d.o.o., Croatia) at a dosage of 2 ml/50 kg b.m. The drain-gauze was removed 5 days after the surgery. The wound continued to heal without complications. The skin stitches were removed 14 days after the surgery. The wound healed by first intention.

Discussion

Scrotal hernia in small ruminants is a rare disorder (ROBERTS, 1988), although inguinal hernia is relatively common in bulls, boars and rams (AL-SOBAYIL and AHMED, 2007). Inguinal hernia develops when loops of intestine or other abdominal organs protrude through an enlarged inguinal ring into the inguinal canal. When the protrusion of abdominal organs extends into the scrotum, a scrotal hernia is formed (St JEAN, 1995). However, scrotal hernia is rare because the anatomic narrowing of the vaginal tunic within the neck of the scrotum normally prevents the bowels from descending into the scrotum (GILBERT and FUBINI, 2004).

Scrotal hernia in group-housed rams is mostly acquired, and probably results of horn injuries, increased intra-abdominal pressure during mounting, or changes in hormone level by approaching of the breeding season (ORR, 1956; CARR, 1972; BRAUN and COLE, 1985; St JEAN, 1995; GILBERT and FUBINI, 2004; AL-SOBAYIL and AHMED, 2007). However, congenital scrotal hernia has been reported at necropsy in two lambs (DENNIS and LEIPOLD, 1968).

The left side of the scrotum is the primary site for scrotal hernia in rams and mature bulls, probably as a result of the increased pressure of the rumen's weight, or lying in a sternal position with the left rear leg abducted (GILBERT and FUBINI, 2004; AL-SOBAYIL and AHMED, 2007). This applied in the case of our patient. However, a unilateral scrotal

hernia affecting the right side of the scrotum has also been described in male lambs, young bucks and rams (ABDIN-BEY and RAMADAN, 2001; BRAUN and COLE, 1985; AL-SOBAYIL and AHMED, 2007).

An enlarged inguinal ring predisposes rams to the development of both inguinal and scrotal hernia (CARR, 1972; SMITH, 2006; AL-SOBAYIL and AHMED, 2007). The heritability of this fault is not understood yet (BRAUN and COLE, 1985); however, CARR (1972) suggested that Merino rams, probably due to inbreeding, are genetically predisposed, and inheritance is assumed to be recessive in nature. Therefore, most experts agree that a ram and its siblings displaying this hereditary fault should be removed from breeding management (CARR, 1972, ROBERTS, 1988; SMITH, 2006).

The incidence of scrotal hernia is higher in male lambs and bucks under one year of age (DENNIS and LEIPOLD, 1968; CARR, 1972; BRAUN and COLE, 1985; ABDIN-BEY and RAMADAN, 2001). However, it has also been described in older rams (CARR, 1972), such as the one in this report. Relaxation and stretching of the abdominal muscles in older animals result in enlargement of the inguinal ring, thus increasing the chance of herniation (St JEAN, 1995; AL-SOBAYIL and AHMED, 2007). Considering its age, group housing, and using to breeding, and the case history on the duration of the process, we assumed that the ram was suffering from an acquired scrotal hernia.

The scrotal hernia surgical repair involves herniotomy and herniorrhaphy. Unilateral orchietomy is recommended in order to preserve the function of the remaining testicle, and to prevent reherniation or seroma formation (GILBERT and FUBINI, 2004; AL-SOBAYIL and AHMED, 2007). A unilateral disorder in the scrotum, such as herniation, compromises the contralateral testicle due to pressure and elevated scrotal temperature, which results in the production of abnormal semen. However, an attempt to save the testicle affected by scrotal hernia can be made (GILBERT and FUBINI, 2004). A successful return to function of the affected testicle was observed in one male lamb after the surgical repair of a scrotal hernia without hemiorchiectomy (BRAUN and COLE, 1985). At the owner's request, we performed herniotomy, herniorrhaphy and unilateral orchietomy in order to preserve the remaining right testicle.

Surgical treatment includes a vertical incision the length of testicle through the skin and fascia scrotalis along the lateral side of the scrotum. This incision is followed by a blunt dissection of the vaginal tunic together with the testicle; however, the vaginal tunic may be opened if necessary. The hernial content is lowered into the abdomen by torsion of the spermatic cord and manual pushing of the omentum and bowels through the inguinal ring (AL-SOBAYIL and AHMED, 2007; GILBERT and FUBINI, 2004; ABDIN-BEY and RAMADAN, 2001). The spermatic cord is usually double ligated, with one transfixation suture and one circumferential ligature. The transfixation suture helps in ligature slippage prevention (GILBERT and FUBINI, 2004). Afterwards, structures distally

to ligatures are either transected or emasculated (GILBERT and FUBINI, 2004; ABDIN-BEY and RAMADAN, 2001).

The herniotomy of the ram in this report was made by a longitudinal skin incision extending 50 cm distal to the base of the scrotum. Following the evacuation of serous fluid and blunt dissection, the vaginal tunic was opened in order to identify the irreducible mass at the proximal end of the spermatic cord. The bowel was replaced in the abdomen by torsion of the hernial sac. Afterwards, the spermatic cord and vaginal tunic were transfixed by suture and ligated by circumferential ligature with PGA suture material, diameter 2 USP. All structures distally from the circumferential ligature were then transected.

After orchiectomy, closure of the inguinal ring is performed using polyglycolic acid (PGA) suture material, diameter 5 USP, and for skin closure, non-absorbable suture material is recommended (ABDIN-BEY and RAMADAN, 2001). If opened during surgery, the remaining vaginal tunic is closed using an inverted absorbable pattern. The tissue of the tunica dartos is sutured using a simple interrupted pattern. As the final layer, the skin and subcutaneous tissue are sutured together longitudinally for primary wound healing. However, it would be acceptable if skin wound heals by second intention (TIBARY and VAN METRE, 2004). The excess skin is removed to minimize dead space and to prevent seroma formation. The scrotal fascia is sutured with a continuous suture using absorbable suture material, whereas the vaginal tunic, skin and subcutis are closed as separate layers, in an attempt to let the wound heal by first intention (BRAUN and COLE, 1985; GILBERT and FUBINI, 2004).

AL-SOBAYIL and AHMED (2007) narrowed the external inguinal ring with a simple interrupted suture using catgut, and the final closure of the inguinal canal was made using catgut, PDS or silk suture material, depending on the size of the opening, the duration of the hernia and the age of the affected animal. In this case, herniorrhaphy was done with simple interrupted suture using PGA suture material, diameter 2 USP. Redundant scrotal skin was removed. The subcutaneous tissue and tissue of the tunica dartos were closed with a Kirschner continuous pattern using PDS, diameter 2-0 USP. The skin was sutured with a simple interrupted suture and using silk suture material, diameter 2 USP. Although uncomplicated wound healing was anticipated, an opening in the wound was left in its ventral part to secure safe drainage, due to the presence of gross dead space.

According to AL-SOBAYIL and AHMED (2007), herniorrhaphy is equally successful with the use of either absorbable or non-absorbable suture materials. However, they prefer silk to be used for large hernial defects (more than 4 fingers in diameter), in animals older than 2 years and when the duration of herniation exceeds 8 months. Non-absorbable suture materials are to be used for smaller defects (PDS in defects 3-4 fingers in diameter and catgut in defects smaller than 3 fingers in diameter), when the duration of the hernia is less than 8 months and the affected animal is younger than 2 years. Despite the finding

of an enlarged inguinal ring (9 × 4.5 cm) in the ram in this report and the fact that the animal was 8 years old, it was used absorbable suture materials PGA for herniorrhaphy (i.e. inguinal ring closure).

Postoperative care in a study performed by AL-SOBAYIL and AHMED (2007) consisted of 5 days treatment with penicillin (30 000 IU/kg b.m.) and streptomycin (10 mg/kg b.m.), and a single prophylactic dose of anti-tetanus serum (1 500 IU, s/c). BRAUN and COLE (1985) treated a lamb with an i/v application of 1.5×10⁶ IU procaine-penicillin i/m and 100 mg flunixin-meglumine i/v, sid. GILBERT and FUBINI (2004) prefer antibiotic treatment for 5 to 7 days following the castration of older animals or surgery performed in non-sterile conditions. Stitches are removed 7 to 10 days after surgery (ABDIN-BEY and RAMADAN, 2001). Antibiotic treatment, a combination of penicillin and streptomycin administered for 5 days, was used in this report until the gauze drainage was removed from the wound. The wound healed by first intention, and the skin stitches were removed 14 days after surgery. The ram has successfully been returned to the herd and at the owner's request, it has been using for breeding.

Postoperative complications may include gross swelling, haemorrhage, abnormal drainage and signs of infection, such as depression and loss of appetite, as well as reherniation and seroma formation (GILBERT and FUBINI, 2004). The surgical repair of inguinal and scrotal hernia is usually satisfactory, with a good outcome, and wounds heal without complications; however, AL-SOBAYIL and AHMED (2007) described a complication which developed after the surgical repair of an inguinal hernia, when the owner did not consent to the removal of the affected testicle.

Conclusion

This case report describes the first surgical repair of a scrotal hernia in a German Merino (Merinolandschaf) ram. Surgery was performed in the standard manner, under general volatile anaesthesia. Unilateral herniotomy, and orchiectomy of the affected testicle were performed. Following antibiotic therapy and removal of the gauze drainage, no side-effects were encountered and the wound healed by first intention. There were no postoperative complications and the ram was returned to the herd for breeding.

We assume that the hernia found in this 8-year-old ram was probably acquired, because it appeared several months prior to Clinic referral. Clots found in the veins of the spermatic cord probably caused stasis of the blood, followed by the discharge of fluid which accumulated in the scrotum. Subsequently, the testicle atrophied. It is believed that the cause, in this case, was trauma to the scrotal region.

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SAŽETAK

Ovan pasmine njemački merino, star 8 godina, doveden je na Kliniku za kirurgiju, ortopediju i oftalmologiju Veterinarskog fakulteta u Zagrebu s izrazito povećanim skrotumom. Ovan je bio držan zajedno s ovcama i služio je za rasplod. Vlasnik je primijetio oteklinu u području skrotuma prije nekoliko mjeseci. Oteklina se pomalo povećavala, a mjesec dana prije dovođenja ovna na Kliniku oteklina se prestala povećavati. Kliničkom pretragom utvrđeno je da ovan ima jako povećan, asimetričan i umjereno bolan skrotum. Skrotum je oblikom i veličinom podsjećao na ragbi loptu, a lijeva strana bila je nekoliko puta veća od desne strane. Kao hernijalni sadržaj nađeni su zavoji tankoga crijeva i atrofični testis okruženi velikom količinom tekućega sadržaja. Kirurškim zahvatom u općoj inhalacijskoj anesteziji učinjena je herniotomija lijeve strane skrotuma. Unutar hernijalne vreće na funikulusu nađena je tvorevina veličine dlana, ispunjena krvnim ugrušcima listićaste građe. Uklonjeni su lijevi sjemenik (testis) i patološka tvorevina, te učinjena herniorafija, dok je desni sjemenik po želji vlasnika sačuvan.

Ključne riječi: skrotalna hernija, herniotomija, ovan
