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EVALUATION OF THE EFFECTS OF MEDIAL PATELLAR DESMOTOMY ON FEMOROPATELLAR JOINTS IN NORMAL DONKEYS

(With 1 Table & 3 Figs.)

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تقييم التأثيرات الناتجة عن عملية قطع الرباط
الأنسي للرضفة على المفصل الفخذي الرضفي في الحمير المليمسة

فتحي مكاوي

أجريت هذه الدراسة على ٦ حمير سليمة ، في كل حمار أجريت عملية قطع الوتر الأنسي للرضفة في احدي القائمتين الخلفيتين وأجريت عملية زائفة (فتح الجلد فقط تم خياطه بدون قطع الرباط الأنسي للرضفة) في القائسة الخلفية الأخرى كضابطة . ولقد تم فحص الحمير أربع مرات وذلك لتقييم العرج بها . المرة الأولى قبل اجراء العمليات والثانية بعد اجراء العمليات بشهر والثالثة بعد اجراء العمليات بشهرين والرابعة بعد اجراء العمليات بثلاثة شهور . كذلك تم فحص المفاصل الفخذية الرضفية للحمير باستخدام الأشعة السينية مرتين احدهما قبل اجراء العمليات والأخرى بعد اجراء العمليات بثلاثة شهور ، بعدما أعدمت الحيوانات وتم عمل الصفة التشريحية في الحال للمفاصل الفخذية الرضفية . واتضح من فحص الحيوانات في الشهور الأولى والثاني والثالث أنه نتج عن قطع الرباط الأنسي للرضفة عرج في كل الحمير وتغيرات راديولوجية في خمسة حمير ، واشتملت هذه التغيرات علي تكوين جزئيات عظمية صغيرة علي السطح السفلي الخارجي للرضفة وكذلك تكوين عظم جديد في مكان اتصال الوتر الوسطي بالرضفة كذلك اتضح من الصفة التشريحية للمفاصل التي أجريت بها عملية قطع الرباط الأنسي وجود تشققات في غضاريف عظمة الرضفة وكذلك وجود بعض أجزاء صغيرة من الرضفة غير مغطاة بغضاريف . واتضح من فحص القوائم الضابطة وعمل الصفة التشريحية لها في كل الحيوانات خلوها من العرج والتغيرات الراديولوجية والباثولوجية . ودلت هذه الدراسة على أن عمليات قطع الوتر الأنسي للرضفة في الحمير ينتج عنه تأثيرات باثولوجية في الرضفة ولذلك يجب عدم استخدامها بكثرة وتستخدم فقط في حالات انزلاق الرضفة المستديم بعد التأكد من تشخيصها .

SUMMARY

Medial patellar desmotomy was performed on one (treated) hindlimb and a sham operation on the other (control) hindlimb, of six normal donkeys. The donkeys were examined for lameness before medial patellar desmotomy and at months 1, 2 and 3. The femoro patellar joints were examined radio-

F.M. MAKADY

graphically at month 3. Post-mortem examination of the femoropatellar joints was performed immediately after euthanasia at month 3. All donkeys were lame on the treated limb at months 1, 2 or 3. Radiographic changes, including fragments formation at the distal aspect of the patella and bone production at the attachment of the middle patellar ligament on the patella, were present in 5 donkeys at month 3. Postmortem examination revealed articular cartilage fibrillation or detachment on the patellas of all treated limbs. The control limbs were clinically and radiographically normal throughout the study. Postmortem examination of the control limbs revealed no pathological changes on the patellas of all animals. Medial patellar desmotomy results in pathological changes in the articular cartilage of the patella and adjacent soft tissues. Use of this surgical procedure should be reserved for persistent and confirmed cases of upward fixation of the patella.

INTRODUCION

Medial patellar desmotomy has been commonly recommended in horses for the treatment of upward fixation of the patella, in which the medial patellar ligament "locks" intermittently or persistently over the medial trochlear ridge of the femur. When there is intermittent locking of the patella, treatments such as conditioning the horse to improve quadriceps tone and injection of irritants around the medial patellar ligament have been recommended (NORRIE, 1982). Unfortunately, medial patellar desmotomy has become widely used in the diagnosis and treatment of vague hindlimb lameness or stiffness, even when upward fixation of the patella has not been demonstrated (TURNER, 1984). Recently, osteochondral fragmentation of the distal aspect of the patella was diagnosed radiographically and arthroscopically in 15 horses, 12 of which had undergone medial patellar desmotomy (MCILWRAITH, 1989). Radiographically, the lesions were characterized by spurting or fragmentation of the patella. Arthroscopically, the lesions varied from softening and fibrillation of the articular cartilage to dissecting lesions and osteochondral fragmentation.

The aim of this study is to evaluate the effects of medial patellar desmotomy on clinically and radiographically normal femoropatellar joints in donkeys.

MATERIAL and METHODS

The study was conducted on 6 clinically healthy donkeys aging 2-7 years and weighing 90-120 kg. The animals were determined to be free from lameness at the walk and trot and unresponsive to hindlimb flexion tests. Flexion tests were performed by

MEDIAL PATELLAR DONKEYS

holding the metatarsus parallel to the ground for 90 seconds before examining the donkey for lameness while trotting. Radiographs were made for both femoropatellar joints. The radiographic examinations consisted of lateromedial, flexed lateromedial, and craniocaudal views of the stifle and a flexed cranioproximal to craniodistal (tangential or skyline) view of the patella. Results of all radiographic examinations were determined to be normal before surgery.

Using a randomized block design, one hindlimb of each donkey was designated the control limb (sham operation), and the other is the treated limb (medial patellar desmotomy). The donkeys were sedated for surgery with xylazine (0.33 mg/kg intravenously). The skin over the patellar ligaments was prepared aseptically. The skin between the medial and middle patellar ligaments and the tissues beneath the medial patellar ligament were anesthetized with 2% lidocaine hydrochloride (5 ml). A stab incision was made with a # 10 scalpel blade between the middle and medial ligaments. Mosquito forceps were used to create a tunnel beneath the medial patellar ligament just proximal to its distal attachment to the tibia. In the control limbs, the skin incision was closed with a single suture of 2-0 nylon. In the treated limbs, medial patellar desmotomy was performed with a sharp bistoury. The site was palpated to ensure that all fibers had been cut, and the skin was sutured as in the control limb.

The donkeys were confined to a stall for 3 weeks after surgery, after which they were turned out to pasture and exercised for one hour, four times per week for the remaining period of the project (9 weeks). Sutures were removed on day 14.

At months 1, 2 and 3, the donkeys were examined for lameness at the trot and after hindlimb flexion tests. Lameness was graded on a scale of 0 to 5, with grade 0 being normal (no lameness) and grade 5 being non-weight-bearing. The person performing the lameness examination did not know which limbs were treated and which were controls. At month 3, radiographs of both femoropatellar joints were examined for patellar lesions and changes in the medial to lateral position of the patella on the skyline view. Radiographs were evaluated in a blind manner, the radiologist being unaware of which limb was treated and which was the control.

RESULTS

Lameness Evaluations: (Table 1)

None of the donkeys was lame before medial patellar desmotomy. Grades of lameness and response to flexion tests in the treated limbs are given in table 1. No donkey was lame in the control limb at any of the examinations. Five donkeys were lame in the treated limb at the end of 3 months. The difference in lameness between the control and treated limbs was significant. At month 3, five donkeys had mild diffuse fibrous

thickening at the site of the medial patellar ligament and one donkey had moderate thickening at the same site. There was no evidence that surgery had been performed on the control limbs.

Radiographic Examinations: (Table 1)

None of the donkeys had radiographic abnormalities of the femoropatellar joints before medial patellar desmotomy. Radiographic lesions did not develop in the control limbs of any donkeys. There was radiographic evidence of osteochondral fragments at the distal lateral patellar surface in two limbs in which medial patellar desmotomy was performed (Fig. 1). Three treated limbs had bone production at the attachment of the middle patellar ligaments on the patella (Fig. 2). One limb had no radiographic abnormality. Visible medial or lateral position change of the patella did not develop in any of the donkeys.

Post-mortem Examinations: Table 1)

There are no abnormalities of articular cartilage or fragmentation evident in the control limbs. All limbs treated by medial patellar desmotomy had evidence of articular cartilage fibrillation or detached cartilage at the distal lateral aspect of the patella. In four treated limbs, there were loosely attached fragments of bone and cartilage at the distal aspect of the patella. These fragments were attached by soft tissue to the patella; there was no evidence that they had been fractured off the patella (Fig. 3).

DISCUSSION

In this study medial patellar desmotomies were performed in a recognized manner (STANSHAK, 1987). Each donkey was allowed three weeks stall rest before resuming light exercise that was less demanding than would be normally expected after medial patellar desmotomy in most clinical cases. Even so, lameness was present in almost all donkeys at months 1, 2 or 3. In 5 donkeys, lameness was mild (grade 1 or less on a scale of 5), or only visible after hindlimb flexion tests. In donkeys with bilateral medial patellar desmotomy, such lameness may not be clinically apparent. The may be the reason that lameness has not been reported frequently after medial patellar desmotomy. Because of the persistence of the lameness even after 3 months, however, it appears that the previously recommended postoperative rest period of 6 weeks may be inadequate (STANSHAK, 1987). Fibrous thickening around the medial patellar ligament was still palpable in all donkeys after 3 months; therefore, this structure should be palpated as part of a routine lameness or prepurchase examination.

On radiographic examination, it was not possible to detect change in the lateral-medial position of the patella on either the craniocaudal or flexed cranioproximal-craniodistal (tangential or skyline) views. However, follow-up radiographs were not obtained

MEDIAL PATELLAR DONKEYS

until month 3, and some positional changes in the patella may have been present earlier. The fragments at the distal aspect of the patella and bone proliferation at the site of attachment of the middle patellar ligament to the patella were suggestive of altered biomechanical forces in the femoropatellar joint after medial patellar desmotomy. The bone production was indicative of increased tension on the middle patellar ligament after transection of the medial ligament.

Postmortem examination revealed articular cartilage damage and osteochondral fragments at the distal lateral aspect of the patella. The position of the fragments may have indicated a very slight lateral movement of the patella after desmotomy, although it was not demonstrated in this study. It was not possible to identify adjacent lesions in the femoral trochlear ridges or elsewhere that may have accompanied or caused such fragment formation.

In reported clinical cases of distal osteochondral fragmentation of the patella, the fragments appeared to be fractured from the distal aspect of the patella, and there was a distinct "bed" from which the fragments had apparently arisen (MCILWRAITH and MARTIN, 1989). In the current study, the lesions produced experimentally were not identical to those seen clinically. However, the donkeys in this study were not subjected to the same training as the clinical patients and were observed for only 3 months after medial patellar desmotomy. The bone production at the middle patellar ligament attachment has been observed in clinical cases after medial patellar desmotomy (MCILWRAITH, 1989).

The results of this controlled experiment prove conclusively that medial patellar desmotomy in normal donkeys causes pathological changes in the distal articular cartilage of the patella and adjacent soft tissues, resulting in persistent lameness. The development of these lesions is suspected to be caused by instability of the patella. In view of these findings, we recommend (1) that medial patellar desmotomy should be performed only for persistent and confirmed cases of upward fixation of the patella after failure to respond to more conservative treatments, and (2) that a sufficient convalescent period be allowed to restabilize the femoropatellar joint before forced exercise.

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LEGEND OF FIGURES

- Fig (1):** Flexed lateromedial radiograph of donkey femoropatellar joint, A. 3 months after medial patellar desmotomy. A small fragment at the distal aspect of the patella (arrow). B. Normal patella from the control limb.
- Fig. (2):** Flexed lateromedial radiographic view of donkey patellas, 3 months after medial patellar desmotomy. There is bone production at the middle patellar ligament attachment site (arrow). B. Normal patella from the control limb.
- Fig. (3):** Postmortem view of fragments at the distal lateral aspect of the patella, (arrow) 3 months after medial patellar desmotomy.

MEDIAL PATELLAR DONKEYS

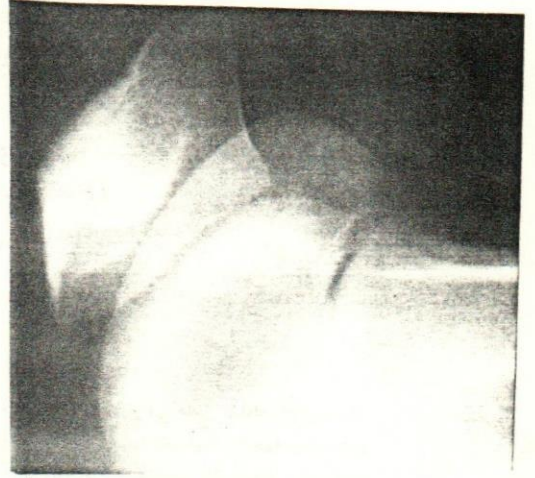
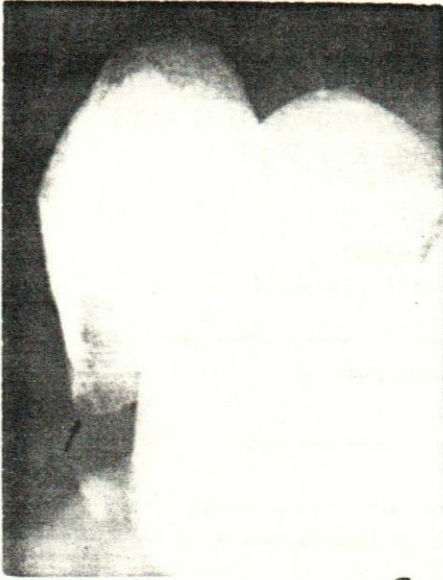
Table (1): Lameness, Radiographic and Postmortem findings after medial patellar desmotomy*

Donkey No.	Lameness before Flexion Test (Scale 0-5)**			Radiographic Changes	Postmortem Findings
	1 Mo	2 Mos	3 Mos		
1	3 (+)	3 (+)	2 (-)	Small fragment distal lateral part of the patella.	Bony fragment at the distal lateral patella and ridge of undermined cartilage
2	0 (-)	0 (-)	1 (+)	None	Minor transverse cracking of cartilage at distal lateral part of the patella.
3	1 (+)	0 (+)	1 (-)	Two small fragment at the distal lateral part of the patella	Two small fragments, and transverse cracking of cartilage at distal lateral part of the patella
4	0 (-)	0 (-)	0 (+)	Bony production at the distal Middle part of the patella	Superficial fibrillation of cartilage and small bony fragment at the distal part of the patella.
5	1 (+)	1 (+)	1 (-)	Bony production at the distal Middle part of the patella	Ridge of raised cartilage with superficial fibrillation at distal lateral part of the patella
6	3 (-)	2 (-)	1 (-)	Bony production at the distal Middle part of the patella	Bony fragment at the distal lateral patella and transverse cracking of cartilage.

* There were no lamenesses, radiographic, or postmortem findings in any of the control (sham operation) limbs.

** Response to hindlimb flexion: (+) positive or (-) negative.

Lameness grades: 0 - no lameness; 1 - lameness inconsistently visible at the trot; 2 - lameness consistently visible at the trot; 3 - lameness, visible at the walk; 4 - reluctant to bear weight; 5 - non-weight-bearing.

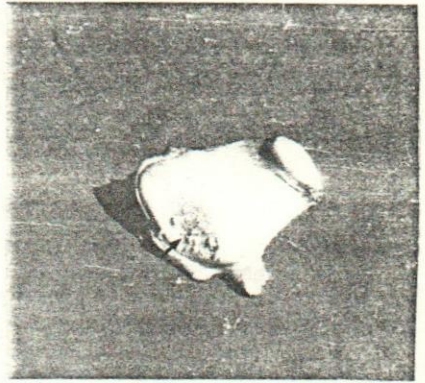


a 1

b



2



3