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Case Report

Repair of Pectoralis Major Rupture in a Professional Athlete - A Case Report

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Abstract

Pectoralis major (PM) tear is an uncommon athletic injury mainly affecting males between 20-40 years of age. The injury reportedly occurs during weightlifting and bench pressing but is not frequently reported for athletes like volleyball players. PM tears present with sudden-onset and sharp pain in the chest following any vigorous physically activity. We present a case of previously healthy 26-year-old male athlete who presented to the outpatient department with chronic (4 months) sharp pain in the right chest that got worse with activity. MRI revealed a tear at the sternal head of PM. After counselling the patient an informed consent was taken and surgical repair was performed. The ruptured part was retracted, mobilized, and sutured with Fiber wires. We used an EndoButton (tight rope) to fixate the muscle at its insertion. Close follow-up and guided strength training was employed. The patient was allowed to return to sports 6 months after surgery. This is the first of its kind surgery in the district of Faisalabad and the first reported case of pectoralis major rupture treatment in Pakistan.

Keywords: Pectoralis Muscles; Athletes; Return to Sport; Athletic Injuries; Pakistan

Abbreviations

PM: Pectoralis Major Muscle; MRI: Magnetic Resonance Imagining; OTC: Over-the-counter; ROM: Range of Motion; AAROM: Active Assisted Range of Motion; DASH: Disability of the Arm, Shoulder and Hand

Introduction

Pectoralis major (PM) muscle works as the adductor, flexor, and medial rotator of the arm at the glenohumeral joint. PM has two originating heads, the clavicular and sternal and it inserts on the lateral lip of intertubercular sulcus of the humerus [1]. Isolated pectoralis major tears are uncommon injuries, usually occurring in male with a mean age of 31.48 years (range 18-59 years). The population varies and may include weightlifters, athletes, and sedentary workers [2]. The majority of the cases of PM rupture arise from bench pressing. The unique insertional anatomy of the pectoralis major makes the sternal head mechanically disadvantaged during eccentric contraction with the arm abducted and extended [2]. Due to the rarity of this injury, PM tears may go undiagnosed and need proper clinical evaluation. Prompt diagnosis and recommended treatment is essential for adequate regain of the PM function and timely return to sports. The gold standard for diagnosis is magnetic resonance imaging (MRI) and the preferred treatment option for young adults is surgical repair. Non-surgical treatment is recommended for older patients [3]. Our case reports a delayed presentation of PM tear of a professional

volleyball athlete who recovered fully and returned to sports. This is reportedly the first case from Pakistan regarding the repair of chronically ruptured pectoralis major repair.

Case Presentation

The patient is a 26-year-old male who is a professional athlete and represents Pakistan in National Volleyball team. He presented to the outpatient clinic with a history of sharp right chest pain for the past four months. The pain started suddenly after a vigorous volleyball game and was severe in intensity. The pain got worse with activity and training and did not respond to over-the-counter (OTC) painkillers. The patient had significant impairment of function and interference in sports performance. During the past four months the patient was recommended non-operative treatment from various orthopedic surgeons due to complications of the surgery. Physical examination revealed tenderness in the anterior chest and a positive PM stress test. MRI (Figure 1 – 2) scan revealed rupture of the sternal head of pectoralis muscle near its humeral insertion. The patient was counselled, and an informed consent was taken for surgical repair of the torn PM.

Figure 1: Axial view of shoulder, showing (arrows) tear of Sternal head of Pectoralis Major muscle.

Figure 2: Coronal view indicating the pectoralis major muscle tear.

The patient was laid in beach-chair position. A vertical incision in front the axilla was utilized to expose the torn muscle part (Figure 3). The torn muscle part was retracted back to place and stitched with Arthrex FiberWire sutures (Figure 4). A strong hold was assessed, and the patient's hand was taken all the way to the muscles insertion on the humerus. We used a tight rope (End-button) to fix the muscle at its humeral insertion. The button was then flipped over towards the opposite cortex. Repair's strength was assessed intraoperatively, and the shoulder was mobilized in flexion, extension, and rotation to visualize the muscle stretch. Furthermore, fluoroscopic guidance and per-operative X-ray images were used to confirm the positioning of the device (Figure 3,4).

Figure 3: (A) Pre-operative axillary incision showing torn and retracted pectoralis major muscle via fiber wire sutures (B) Post-operative showing reattached Pectoralis major and arm externally rotated.

Figure 4: Intraoperative X-ray of the humerus showing the position of unicortical button: (A) Lateral View; (B) Anteroposterior view.

Postoperatively, the arm was placed in a sling for two weeks. Postoperative supervised rehabilitation was followed with gentle range of motion (ROM) flexion and extension exercises. Active assisted range of motion (AAROM) exercises and external rotation of the arm was started after 6 weeks. Strength training was started after 12 weeks, and patient was assessed for his return to sports at 4 months. He was allowed to return safely to his previous sport after 6 months with precautions to avoid a recurrent injury. Seven months post-operatively, the patient was assessed with incline pushups as shown in the clip (Video 2). Quick Disability of the Arm, Shoulder and Hand (QuickDASH) score was assessed at 6 months evaluation and was, and clinical examination was done on all follow up visits at 2, 6, 12, 18, and 24 weeks. Range of motion and plank hold at 6 months follow ups is shown in pictures below (Figure 5,6).

Figure 5: Normal Axillary fold and healed axillary scare at 6 month.

Figure 6: (Left) Range of motion and (right) plank hold at 6 months.

Discussion

Pectoralis major tear is mostly associated with strength training exercises like bench pressing and gymnasts, but it may also occur in other sports and even in simple exercises like side plank [4]. While there haven't been any reports of a volleyball player sustaining a PM tear, the mechanism is likely to be a forceful hand-strike to the ball, the acceleration phase. The acceleration phase is considered the movement of the overhead abducted arm posterior to the midline (coronal plane), coming anteriorly to hit the ball. Miura., *et al.* recorded that the PM's electromyographic activity was highest during this movement (acceleration) [5]. This is likely the possible mechanism of injury in this case, as the patient described pain after hitting the ball.

The most commonly chosen treatment for PM tear by surgeons, especially in sports-related injuries, is the surgical repair of PM muscle. A systematic review and meta-analysis by Bodendorfer., *et al.* concluded that surgical repair has clinically superior outcomes than non-operative management of the PM rupture. The surgically repaired subjects had statistically significant improvement in functional outcome, isokinetic strength, isometric strength, cosmesis, and resting deformity and was associated with a 14.2% complication rate [2]. Literature review also shown use of grafts for chronic rupture cases like semitendinosus and gracilis autografts, fascia lata autografts, and dermal allografts [2]. The athlete in our case, presented 4 months after the injury and the use of unicortical button for tendon insertion without any graft was successful. The patient had excellent outcomes and range of motions at 6, 12, 18, 24 weeks post-operatively and returned to sports after 6 months. Despite various surgical techniques and professional tips available in the literature, there hasn't been any reported case for surgical

repair of pectoralis major tear in our region (Faisalabad, Pakistan). To our knowledge, this is the first of its case in our region.

Conclusion

Pectoralis major repair have been considered an uncommon sports injury and most commonly occurs in young male athletes during bench pressing. Pectoralis major ruptures can be repaired successfully even in delayed presentations and an excellent functional outcome can be achieved through a supervised rehabilitation. The likely mechanism of PM rupture in volleyball athlete is during the overhead acceleration against resistance when aiming to hit the ball.

Informed Consent

Written informed consent was obtained from the patient.

Ethical Approval

Ethical approval was not required for this case.

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