Arthroscopic Release of Gluteal Muscle Contracture Provides Satisfactory Functional Outcomes

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Introduction

Gluteal muscle contracture (GMC) is a known epidemic condition of the hip in China [1, 2]. It has also been reported in various parts of the world including Africa, India and even in the United States [1]. The etiology of GMC is repeated intra-gluteal injection of penicillin [3].

The pathognomonic feature of GMC is abduction and external rotation deformity along with limited flexion and adduction [3]. Patients are unable to bring their knees together when they squat (squatting sign) (Fig.1), and crossing or overlapping the legs is always difficult (cross sign) (Fig.2). Other physical findings are out-toeing gait, positive Ober's sign, snapping sound or click [3]. The radiological features include iliac hyper-dense line (Fig.3) and pelvic tilt in X-Ray pelvis and gluteal muscle atrophy in MRI and CT scan [4].
Fig. 1. Squatting sign

Fig. 2. Cross sign

Fig. 3. X-ray pelvis AP view shows Iliac hyper-dense line (red arrow)
The treatment of an established GMC is surgical release. Open surgical release of GMC has been performed since many decades with a satisfactory clinical and functional outcome [5]. However, the open release is associated with a big surgical scar, hematoma formation, and infection, etc. The arthroscopic release is a relatively new technique and mainly limited in China [2]. Different arthroscopic techniques have been introduced and reported a comparable functional outcome as compared to open release [1].

**Purpose** The primary aim of our study is to introduce arthroscopic release technique which we called as F and C method, and secondary aim is to evaluate the functional outcomes and complications.
Materials & Methods

From Jan 2013 to Jan 2017, a total of 192 patients with 373 hips has been treated arthroscopically using F and C method. One hundred and eighty-one patients had bilateral GM, and remaining 11 patients had unilateral. According to Zhao classification system of GMC, 72 hips were Level 1; 226 hips cases were level 2, and remaining 75 hips were Level 3 [6]. The mean age of the patients was 24.6 years (10-47 years).

Surgical Technique: Important anatomical landmarks such as greater trochanter, anterior and posterior border of contracted gluteus muscles and course of sciatic nerve were marked. 2 or 3 portals technique was applied in the neutral lateral position (Fig. 4). An artificial space, about 8cm X 6 cm, was created between the interval of subcutaneous tissue and contracted gluteal muscles. Contracted gluteal muscles appeared as a silvery white structure under arthroscopy. Division of contracture using a radiofrequency ablation device was then performed in F & C shape (Fig. 5). Initially, division of the iliotibial band (ITB) was started from the center of the greater trochanter (GT) and continued superiorly up to about 10 cm longitudinally.
Then, the radiofrequency device was faced anteriorly to divide contractures of tensor fascia lata (TFL), and continued up to the anterior superior iliac spine (ASIS). Gluteus maximus contractures were then divided transversely from 1 cm below superior pole of GT until silvery white bands of contractures were visible, which completed the F shaped release of GMC. The instruments were then advanced deeper to visualize and divide contractures of deeper structures such as insertion of gluteus maximus, gluteus medius, gluteus minimus and other deeper structures including hip external rotators around the GT in C shape fashion. Any visible bleeders were meticulously cauterized. Eventually, complete division of contracture was assessed carefully with flexion adduction and internal rotations of the leg, Ober’s sign, cross leg sign, and palpable click (Fig. 6). Routinely, a drainage tube was placed in, and wounds were closed. Rehabilitation: Rehabilitation was initiated following drainage tube removal within 24 to 48 hours post-operation. Patients were placed in continuous passive motion (CPM) machine to allow passive hip and knee exercises, followed by an active range of motion exercises. The patients were then allowed to walk, crossing legs and crouching with closed knees.
Fig. 4. Anatomical landmarks

Fig. 5. Schematic diagram showing GMC release by F and C method

Fig. 6. Intraoperatively patient is able to cross the legs
Results

Patients were followed up for 1-5 years (mean 2.8 years). Cosmetic satisfaction of the patients was 100%. According to Ye et al. evaluation criteria, 367 hips had an excellent clinical outcome, 4 hips had good outcome [7]. One patient with severe bilateral hip involvement had a recurrence on his left hip but refused for the second operation as he could perform all the activity normally. Three hips had post-operative small hematomas, 2 hips had positive Trendelenburg gait but relieved after 6 months. No wound infection, no sciatic nerve injury, no lateral femoral cutaneous nerve of thigh injury, and no hypertrophic scar occurred.
Discussion and Conclusion

As GMC mostly affects adolescent and adult individuals, there has been a great aesthetic concern [1]. Open GMC release results in excellent clinical outcomes; however, the hypertrophic scar formation is the biggest problem in young individuals [1]. Arthroscopic GMC release has been introduced as a minimally invasive method to overcome such complications [2]. However, very limited previous reports have explained appropriate steps by which the contractile band of GMCs can completely be released. Arthroscopic 'F and C' method allows a very precise and step by step release of contracted GMC. This procedure is not only effective but also safe with a negligible amount of known complications.
References


