NEW IN DIAGNOSTIC OF RESISTANT COMMISSURAL EXTENSION CONTRACTURES OF THE KNEE JOINT

IN 12 PATIENTS MULTISLICE COMPUTED TOMOGRAPHY WITH OXYGEN ADMINISTERING WAS PERFORMED TO REVEAL CAUSES OF FORMATTING OF CONTRACTURES AND CHARACTERISTIC OF STRUCTURAL CHANGES IN SOFT TISSUES IN KNEE JOINT. AGE OF PATIENTS RANGED FROM 17 TO 48 YEARS OLD. REMOTENESS OF DISEASES WAS FROM 2 TO 22 YEARS. ON THE BASE OF MULTISLICE COMPUTED TOMOGRAPHY WE HAVE DETERMINED EXACT LOCALIZATION AND CHARACTERISTIC OF COMMISSURAL PROCESS; IT HELPED US TO CHOOSE A CORRECT TACTIC OF SURGICAL INTERVENTION. RESULTS IN ALL OPERATED 12 PATIENTS WERE OBSERVED UNTIL 6 MONTHS.

KEYWORDS: Extension contracture, stiff knee, multislice computed tomography.

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BACKGROUND

Knee joint contractures are severe consequence of weight-bearing system. Restoration of lost function of the knee is one actual issue of modern traumatology and orthopaedics. As known, in many cases the causes of knee stiffness are bone fractures forming knee joint and severe trauma of soft tissues around knee. Extension contracture of the knee is one of the severe consequences of lower extremity that significantly limits functional possibilities of patients and leads to disability of victims (Mironova et al., 1982; Yugay, 1994). After appearance of contracture of any etiology the secondary deep changes are developed in muscles, tendons and ligaments, joint capsule, skin with subcutaneous tissue, fascia and even cartilage and bone tissues with expiration of date. The longer appearance of contracture, the deeper and more extensive are secondary changes. Muscles become atrophied as if they are contracted at flexion site and lost elasticity. Muscles at site of extension are felt as they are over pulled, weakened, and paralyzed. Also, it is necessary to take into account degenerative-dystrophic changes in tissues resulting from a long immobilization even without preceding injury and in result of forced inactivity in chronic scarry contractures (Shumada et al., 1986; Kojevnikov, 2004; Kojevnikov, 2006).

Diagnosis is not difficult but clarification of causes of contracture and determination of characteristics of structural changes of soft tissues which provide knee joint function may be a difficult problem. It is impossible to agree on surgical tactics without clearing the cause of contracture and not revealing characteristics of structural changes in soft tissues, the state of articular surface of the patella, femur and tibia. Diagnosis and determination of surgical intervention tactics play an important role in treatment of extension contracture of the knee (Kazak, 1996; Kazak et al., 1992).

MATERIALS AND METHODS

In Sport trauma department of Research Institute of Traumatology and Orthopedics (Uzbekistan) in 12 patients (8 male, 4 female) the multislice computed tomography with administering intraarticular oxygen was carried out to clarify causes of contractures and character of structural changes of soft tissues providing knee joint function. Age of patients ranged from 17 to 48 years old. Remoteness of diseases was from 2 to 22 years. Causes of contractures were a long immobilization after femur fracture in 6 patients (5 male, 1 female), 2 patients (2 male) had complicated osteomyelitis after femur fracture. In 3 patients (1 male, 2 females) extension contracture was developed after a long...
immobilization of the knee injury (meniscus tear, patellar fracture and hemarthrosis). 1 patient was after gun-shot injury of the patella.

Oxygen administering multislice computed tomography was carried out in dressing room, in supine position of patient with extended legs. In sterile conditions the skin around knee joint is cleaned and covered with sterile towel. Under local anesthesia with 0.5-1% novocain a needle is administered to the lateral upper point of the knee. Depending of the joint volume the knee joint is administered with 60-100 cm3 of oxygen. As there is commissural process in the knee joint the oxygen was administered under pressure by syringe. As soon as syringe is extracted, a point of injection is dressed with spirits; multislice computed tomography investigation is performed.

Multislice computed tomography is an advanced generation of computed tomography technologies. Multislice computed tomography with intraarticular administering of oxygen contributed to assess joint cavity, joint elements, character of structural changes and relationship of surrounding soft tissues to each other.

Commissural process of intraarticular and extraarticular character was revealed in all patients. This is explained that in remoteness of diseases more than two years in muscles, the secondary changes are occurred in tendons and ligaments, joint capsule, skin with subcutaneous tissue, fascia and even cartilage and bone tissue. We clarified characteristic of secondary changes of joint elements and surrounding tissues using multislice computed tomography with administering of oxygen; this helped us to decide on tactics of surgical treatment of patients with knee joint contractures. In all 12 patients we performed mobilization of quadriceps muscle and the knee joint. Arthrolysis and mobilization with arthroplasty using preserved allogenic umbilical cord were performed in 2 patients from this group.

**Results and discussion**

It is known that many factors influence on clinical outcome. Among such factors there are particularly remoteness of trauma, range of motion, pathogenetic cause of contracture, secondary changes in muscles, tendons and ligaments, joint capsule, skin with subcutaneous tissue, fascia and even cartilage and bones.

On the base of multislice computed tomography we found character and exact localization of commissural process, it helped us to choose a correct tactic of surgical intervention.

During operation we compared visual data with data of multislice computed tomography. In fact, secondary changes in muscles, tendons and ligaments, joint capsule, skin with subcutaneous tissue, fascia and even cartilage and bone tissues were corresponded to the data of multislice computed tomography. Multislice computed tomography has many advantages than previous generation of CT technologies, including validity of results and shortening time of scanning.

There is possibility to receive more thin slices and investigate extensive areas in one-time breath-holding and stopping other types of motions. Breath-holding and motions stopping were problem during CT investigation in children, restless and old patients. With multislice CT it is possible to investigate large areas of the body from 7 to 15 seconds. Thin collimated slices till 0.5 mm allow receiving reconstructed slices in different planes and well-defined reconstructions in three-dimensional images. Thin slices allowed receiving structure of joint and joint elements, subchondral layer and bone structure in all directions and required thickness.

All operated 12 patients were observed on near-term results until 6 months. Criterion of assessment of treatment was range of motion of the joint. Good results occurred in 11 patients. Criterions of good result were range of motion 100 degrees, achieved flexion was more than 90 degrees. Satisfactory result occurred in 1 patient. Knee flexion was 90-100 degrees; arc of motion was 80-90 degrees.
Conclusion

Thus, multislice CT with intraarticular administering of oxygen in different forms of extension contractures of the knee joint allows clarifying precise location and characteristic of commissural process, finding out state of structural changes in soft tissues in different etiology of the stiff knee, and choosing correct tactic of surgical intervention.

Multislice CT with intraarticular administering of oxygen in extension contractures of the knee joint allowed us to approach objectively for determination of indication and choice of treatment methods in majority cases.

References


