Lateral meniscal lesions in patients with clinically suspected medial lesions

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Double-contrast arthrography and arthroscopy were performed in a prospective study on 46 consecutive patients clinically suspected of having a medial meniscal tear only. At arthrography, 38 torn medial menisci were found; four of them were, however, false-positive and another false-negative as compared with arthroscopic examination. Moreover, seven unsuspected lateral meniscal tears were diagnosed at both arthrography and arthroscopy. The diagnostic accuracy of the double-contrast arthrography was well above the clinical accuracy, and we conclude that arthrography is a reliable method for diagnosing both medial and lateral tears.

A meniscal tear can be diagnosed by clinical examination in about 70 percent of the patients (Noble and Erat 1980, Daniel et al. 1982). If double-contrast arthrography is added, the diagnostic accuracy will increase to over 90 percent (Andrén and Wehlin 1960, Nicholas et al. 1970, Kaye and Freiberger 1975) and the same degree of accuracy is achieved when arthroscopy is employed (Dandy and Jackson 1975, DeHaven and Collins 1975, Gillquist et al. 1979). Arthroscopic failures are most often due to difficulties in visualization of the posterior part of the medial meniscus (Ireland et al. 1980), whereas arthrography has its weakness in diagnosing tears of the lateral meniscus (Kaye and Freiberger 1975). Using both methods, an even better accuracy may be expected (Ireland et al. 1980, Levinsohn and Baker 1980, Selesnick et al. 1985). We have employed both double-contrast arthrography and arthroscopy in a consecutive series of patients to evaluate the clinical relevance of these methods.

Patients and methods

We studied prospectively 46 consecutive patients (36 males and 10 females) diagnosed in our knee clinic as having a tear of the medial meniscus. Patients with prior knee surgery, ligamentous injuries, or any other suspected pathology were excluded. The mean age at the examination was 32 years.

All the patients underwent double-contrast arthrography followed by arthroscopy. The mean interval between the two procedures was 15 (1–106) days, and no patient had sustained any further injury to the knee during that interval.

Prior to arthroscopy the patients were reexamined by the arthroscopist, and the clinical diagnosis of a torn medial meniscus was ascertained. Thus, all the patients had been examined twice by orthopedists. The symptoms and clinical signs of the patients are given in Table 1.

A cost analysis for the arthrographic and arthroscopic procedures was performed, taking into account cost of staff, equipment, and rent of premises.

Arthrography

The arthrographies were performed and read by the same 2 experienced radiologists. After evacuation of any joint fluid, 3–5 mL of Iohexol, 350 mg Ioidine/mL (Omnipaque®, Nycomed, Oslo, Norway) was injected into the knee followed by 20–40 cm^3 of air. The knee was then exercised. The radiographic examination was performed under fluoroscopic control in both the supine and the prone position with the thigh strapped and with manipulation of the joint for optimal visualization of the menisci. The results concerning the me-

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Table 1. Suspected medial meniscal tears in 46 patients

Case	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	X
1	M	57	1	1	0	1	2	1	1	0	0	0	1	2	0	0	1	0	2	0	2	1	1
2	M	55	0	1	1	3	0	1	0	0	0	0	1	0	2	0	1	0	4	0	0	2	1
3	F	49	1	3	0	3	2	1	1	0	0	0	1	0	0	1	1	0	3	0	3	2	1
4	F	48	1	0	1	2	3	1	1	0	1	0	6	0	2	0	1	1	4	0	3	0	1
5	M	47	0	0	0	1	0	1	1	0	0	0	1	2	0	0	1	0	5	0	0	4	2
6	M	46	1	1	0	2	0	0	1	0	0	0	1	2	2	0	0	1	2	0	0	2	1
7	M	44	0	3	1	3	3	1	1	5	1	1	1	0	2	0	0	1	0	0	1	2	1
8	M	43	0	0	0	3	0	1	0	0	0	1	1	0	2	1	1	1	5	0	0	1	1
9	M	42	0	2	1	0	1	0	1	0	1	1	1	0	2	0	1	0	5	0	0	2	1
10	F	42	1	0	1	2	3	0	1	0	1	0	1	0	0	0	0	0	2	0	0	7	3
11	M	41	1	0	0	2	0	1	0	0	1	0	1	2	2	0	0	0	2	0	0	2	1
12	M	41	1	1	1	2	2	1	1	0	1	1	1	0	2	1	0	0	3	0	0	2	1
13	M	41	1	0	0	1	3	0	1	0	0	0	1	0	1	0	0	0	3	2	0	8	3
14	M	41	1	0	1	2	1	1	0	0	0	1	1	0	2	0	1	0	6	0	0	2	1
15	M	41	1	2	0	1	3	1	1	0	1	0	6	0	0	0	0	0	6	0	0	1	1
16	M	39	1	0	1	2	2	1	1	0	0	0	6	0	1	1	0	0	3	4	0	8	3
17	M	39	1	3	1	3	2	1	1	0	0	0	1	0	2	0	1	0	5	0	1	2	1
18	F	38	1	0	1	3	0	1	0	0	0	0	1	0	2	1	0	0	6	0	0	2	1
19	F	38	1	0	1	1	0	1	0	0	0	1	1	0	2	0	0	1	5	0	0	7	2
20	M	38	0	0	1	1	0	1	0	0	1	0	1	0	2	0	1	0	1	0	0	2	1
21	M	37	1	0	1	2	3	1	1	0	0	0	1	0	2	1	1	0	5	0	0	2	1
22	F	33	1	0	0	2	3	1	1	0	1	1	1	0	2	0	1	0	0	0	0	2	1
23	M	33	1	2	0	0	0	0	0	0	1	0	1	0	2	0	0	1	5	0	0	5	3
24	M	32	1	0	1	1	0	0	1	0	0	1	1	0	0	1	0	0	3	0	0	2	1
25	M	31	0	0	0	1	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	2	1
26	F	30	1	0	1	2	3	1	1	0	1	0	1	0	2	1	0	0	6	0	0	0	0
27	M	28	0	2	1	1	3	1	0	0	0	0	1	0	2	0	0	0	1	1	0	0	0
28	F	28	1	0	1	1	3	1	0	0	1	0	1	0	0	0	0	0	6	0	0	1	1
29	M	26	1	0	0	1	0	0	1	0	0	0	1	0	0	0	0	0	0	0	2	8	2
30	M	26	1	0	1	2	3	1	1	0	1	0	1	0	2	0	1	1	5	0	0	2	1
31	M	24	1	0	1	2	0	1	1	0	0	0	1	0	2	1	1	0	5	0	0	2	1
32	M	23	1	0	0	2	3	1	1	0	1	1	1	0	2	0	1	0	4	0	0	2	1
33	M	22	1	1	0	0	0	1	1	0	1	0	6	0	0	0	0	0	0	0	2	0	0
34	M	23	1	0	0	1	0	1	1	0	1	0	1	0	2	0	0	0	6	0	0	2	1
35	M	22	1	2	1	3	2	1	1	0	1	0	3	0	0	0	0	0	3	0	0	1	0
36	F	21	1	0	1	2	3	0	1	5	0	0	1	0	2	1	0	0	2	0	0	2	1
37	M	20	1	0	1	1	2	0	0	0	0	1	1	0	2	1	0	1	0	0	0	2	1
38	M	19	1	2	1	2	1	1	0	0	0	0	6	0	0	0	1	0	1	0	0	2	1
39	M	20	0	2	1	1	3	0	0	0	1	0	6	0	3	0	0	1	5	3	0	0	0
40	F	19	1	2	1	1	3	1	0	1	1	0	1	0	2	0	1	0	1	0	1	2	1
41	M	19	1	0	0	1	3	1	1	0	1	1	1	0	2	0	1	0	4	0	0	1	0
42	M	19	1	0	0	1	0	1	0	0	1	0	1	0	0	0	1	0	6	0	0	2	1
43	M	18	0	0	1	1	3	1	0	0	1	0	1	0	0	1	1	0	2	0	0	0	0
44	M	17	1	1	1	2	1	1	1	0	1	0	1	0	2	0	0	0	6	0	0	0	0
45	M	15	1	0	0	1	3	0	1	0	0	0	6	0	2	0	0	0	5	0	0	2	1
46	M	15	1	0	0	2	3	1	1	0	0	0	1	0	2	1	1	0	4	0	0	2	1

A sex.
B age.
C trauma: 0 no, 1 yes.
D pain at rest: 0 no, 1 sometimes/month, 2 sometimes/week, 3 daily.
E pain when walking: 0 no, 1 yes.
F pain when running: 0 no, 1 sometimes, 2 always, 3 not able.
G pain on climbing stairs: 0 no, 1 upstairs, 2 downstairs, 3 upstairs and downstairs.
H problems on kneeling/squatting: 0 no, 1 yes.
I problems when cutting: 0 no, 1 yes.
J giving way: 0 no, 1 yes.
K catching: 0 no, 1 yes.
L locking: 0 no, 1 yes.
M location of pain: 1 inside of knee, 2 outside, 3 anteriorly, 4 posteriorly, 5 interiorly, 6 more than one location.
N decreased range of motion: 0 no, 1 extension deficit, 2 flexion deficit, 3 extension and flexion deficits.
O positive rotation tests: 0 no, 1 inward rotation, 2 outward, 3 inward and outward.
P pain on hyperextension: 0 no, 1 yes.
Q pain on hyperflexion: 0 no, 1 yes.
R McMurray's sign: 0 no, 1 yes.
S palpation tenderness, medial: 0 no, 1 anterior part, 2 joint line middle part, 3 posterior part, 4 = 1 + 2, 5 = 2 + 3, 6 = 1 + 2 + 3.
T palpation tenderness, lateral joint line: as above, S.
U palpation tenderness, patella: 0 none, 1 medial facet, 2 lateral facet, 3 medial and lateral facets.
V meniscal tear at arthrography: 0 none, 1 medial possible, 2 medial definite 2, lateral possible 3, 4 lateral definite, 5 = 1 + 3, 6 = 1 + 4, 7 = 2 + 3, 8 = 2 + 4.
X meniscal tear at arthroscopy: 0 none, 1 medial, 2 lateral, 3 medial and lateral.

Table 2. Arthrographic and arthroscopic findings regarding the medial and lateral menisci. The results concerning the lateral menisci are given in brackets

Arthroscopy	Arthrography		
	Definite lesion	Possible lesion	Normal
Meniscal lesion	29 (4)	5 (3)	1 (0)
Normal	2 (0)	2 (0)	7 (39)

nisci were divided into three categories: normal meniscus, possible meniscal lesion, and definite meniscal lesion. The evaluation of the arthrographic findings was performed before arthroscopy and remained unknown to the surgeon until he reached an arthroscopic diagnosis. Then, he was informed about the arthrographic diagnosis, so that he could continue with any produre considered necessary.

Arthroscopy

Arthroscopy was performed by three orthopedists using the technique described by Gillquist and Hagberg (1976). Probes were used to test the integrity of the menisci, and a mechanical leg-holder was always used, as was a tourniquet. The arthroscopies were performed as outpatient procedures, and any necesary surgery was undertaken in the same session. The results of the arthroscopic findings were used as a reference.

Results

Arthrography revealed 38 and arthroscopy 35 medial meniscal tears (Table 2). Arthrography had one false-negative and four false-positive findings as compared with arthroscopy; thus, there were 11 normal medial menisci. However, at arthrography, an additional seven clinically unsuspected lateral meniscal tears were detected; four of them were classified as definite lesions and the other three as possible lesions. These seven lateral meniscal injuries were found at arthroscopy as well, and four of them were observed in knees with a concomitant medial meniscal injury. These lateral meniscal tears were considered to cause obstruction of the normal function of the knee. There were one bucket-handle tear and six lesions (three radial, two horizontal cleavage, and one flap tear) arising from the posterior horn rendering it unstable. There were eight knees with neither a medial nor a lateral meniscal injury; in 3 patients no intraarticular changes were detected, whereas chondromalacia patellae was observed in 3 patients; and in another 2 patients, chondromalacia of the medial femoral condyle was detected.

The clinical diagnosis of the medial lesions was thus correct in only three fourths of the patients. The arthrographic diagnosis was correct in nine out of 10 examined knees concerning the medial menisci, and all the lateral meniscal lesions were detected at arthrography.

The cost for one double-contrast arthrography was SEK 800 and for one arthroscopy performed as an outpatient procedure SEK 4,000.

Discussion

The reliability of arthrography in detecting meniscal lesions has been questioned. Gillquist and Hagberg (1978) using a single-contrast technique found the diagnosis to be correct in only 60 percent, that is, the same degree of accuracy obtained clinically in the present study. Arthrography has also been considered less accurate in detecting lateral lesions (Kaye and Freiberger 1975, Ireland et al. 1980); but in our study, all the lateral tears were detected at arthrography. Out of the 31 medial menisci classified as having a definite tear, only two were found to be normal at arthroscopy; and out of the seven regarded as having possible lesions, two were normal. None of the seven lateral menisci either classified as definite or possible was normal at arthroscopy. Thus, as long as the arthrographist indicates a possibility of a tear, either medial or lateral, and even if he is not absolutely sure, there is a great likelihood of detecting a lesion at arthroscopy. In the present series the examinations were performed by 2 radiologists with long experience in skeletal radiology, which may have had an impact on the results.

Arthroscopy is a more subtle method than arthrography, because true tears and minor asymptomatic tears may be separated by probing the meniscus under direct observation. Arthroscopy, however, has the drawback that it is difficult to acquire the necessary skills (Noble and Erat 1980), and it may be considered economically costly. In patients with a clinically definite lesion of the meniscus, arthrography does not provide information that cannot be revealed by arthroscopy. Arthrography may, however, help the surgeon not experienced in the arthroscopic technique both as a preoperative control and in planning the surgical approach, because otherwise unsuspected lateral meniscal tears may remain undiagnosed. Thus, we believe that in experienced hands double-contrast arthrography still has a place among the diagnostic procedures in the management of meniscal problems.

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