

From the Orthopaedic Hospital, Aarhus, Denmark.
(Heads: Professor E. Thomassen, M.D., and J. Saugmann-Jensen, M.D.)

ARTHROGRAPHY IN MENISCAL INJURIES OF THE KNEE JOINT

By

JØRGEN SOMMER

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Meniscal injury is still a diagnostic problem, and the value of arthrography as a supplementary diagnostic procedure in clinically doubtful cases is still a matter of discussion. On the other hand, it seems to be widely agreed that arthrography is unnecessary when the clinical diagnosis seems obvious.

The object of the present study was (1) to investigate the accuracy of the arthrographic diagnosis in a material of clinically doubtful cases of meniscal injury and (2) to ascertain whether the diagnostic accuracy is altered by supplementing the clinical investigation by arthrography in clinically doubtful cases.

PRESENT INVESTIGATIONS

In the Orthopaedic Hospital, Aarhus, Denmark, operation is performed without previous arthrography if the clinical diagnosis is "certain", *i.e.* the history and the physical findings make the diagnosis of meniscal injury very likely. In clinically doubtful cases preoperative arthrography was performed up to 1963, but the operative indication was not based solely upon the arthrographic findings.

The arthrographies were carried out in the Radiological Department of the Aarhus County Hospital, and the reports from the radiologists formed the sole basis of whether the arthrographies were considered "positive" or "negative". A positive arthrography is taken to mean that the report indicates an injury or a suspicion of such injury. A negative arthrography is taken to mean that according to the report the appearances are normal.

During the period 1960-1962 arthrography was performed on 166

patients in whom the clinical diagnosis was doubtful. Arthrographies carried out on other indications, *e.g.* a suspicion of a meniscal remnant left by previous meniscectomy, loose body, or the like, were excluded.

Of these 166 patients 98 had operations. The preoperative arthrographic findings and operative results are shown in Table 1.

Table 1. Preoperative Arthrographic Findings Compared with the Operative Findings.

Preoperative arthrographic finding	Number of cases	Operative finding		Percentage of arthrographic error
		Injury	No injury	
Injury	54	37	17	31
No injury	44	23	21	52

Table 2. Result of Follow-Up on the Non-Operated Patients Compared with the Arthrographic Findings.

Arthrographic finding	Number of cases	Followed patients		Not followed
		Injury	No injury	
Injury	4		2	2
No injury	64	8	50	6

It will be seen that out of 54 positive arthrographies 17 were incorrect, *i.e.* a percentage of error of 31. Out of the negative arthrographies 23 of 44 were incorrect, a percentage of error of 52. Thus, in cases where it was possible to check the arthrography by operation, there was a total error in the preoperative arthrographic diagnosis of 40 per cent in cases of clinically doubtful meniscal injuries. It should be pointed out that the error is most pronounced in cases of negative arthrography.

Out of the remaining 68 who did not undergo operation 64 had negative, while 4 had positive arthrographic findings. Out of these 4 patients 1 refused to have an operation. The other 3 were asked to present themselves for operation, but failed to come. Of the 68 patients 33 have been followed up for an average of 4 years (1 year 3 months to 6 years 6 months). Eighteen patients have been followed-up for such a long time that according to the data in the records further follow-up is not necessary. The average follow-up period for these 18 patients is 18 months (6 months—4 years). Out of the remaining 17 I have been in touch with 9 by telephone or letter. All reported that they were symptom

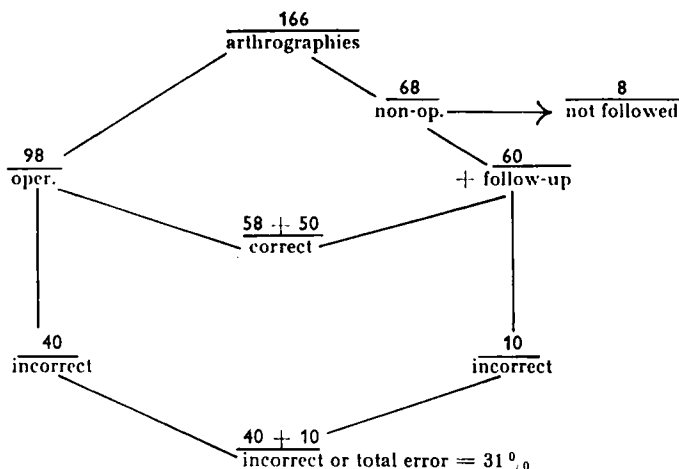


Figure 1. Distribution of correct and incorrect arthrographies assessed on the basis of the operative findings and the result of follow-up on the non-operated patients.

Table 3. Total Diagnostic Error in Operations for Meniscal Injury (Clinically Doubtful + Clinically Definite), with and without Preoperative Arthrography of the Clinically Doubtful Meniscal Injury.

	Year	Number of operations	Number of erroneous diagnoses	Percentage of error
With				
arthrography in clinically doubtful meniscal injuries	1961	142	35	24
	1962	123	30	24
Without				
arthrography in clinically doubtful meniscal injuries	1963	154	39	25
	1964	177	38	21

free. Thus, there is information about 60 out of 68 or 88 per cent of the non-operated patients who had arthrography. The result of the follow-up is given in Table 2.

It will be seen that at follow-up of 60 non-operated patients there was disagreement between the arthrographic diagnosis and the finding at follow-up in 10 and that presumably the arthrographic conclusions were wrong in these 10 cases. To ascertain the total percentage of error in arthrography in clinically uncertain meniscal injury I compared the

arthrographic findings with the operative findings and with the result of the follow-up examination (Figure 1).

It is apparent from the figure that at operation of follow-up of 158 out of 166 arthrographed patients with clinically doubtful meniscal injury, the arthrographic diagnosis was incorrect in 31 per cent.

The total operative error on all the operations done on major or minor suspicion of meniscal injury during the period 1961–1964 incl. may be seen from Table 3. During the years 1961 and 1962 preoperative arthrography was done in clinically doubtful cases, while in 1963 and 1964 this procedure was omitted. It may be seen that the percentage of error is fairly constant from year to year and that in this material arthrography did not increase the diagnostic accuracy.

DISCUSSION

The reported arthrographic accuracy differs within wide limits. *Lindblom* (5) reported an error of 5 per cent, *Sevastikoglou* (8) of 42 per cent, *Oggioni* (6) of 87 per cent. Most authors (1, 2, 3, 4), however, have reported an error of between 10 per cent and 30 per cent. These analyses are based predominantly on surgically confirmed arthrographies. Nothing is stated concerning the non-operated patients, meaning that the patients with a negative arthrography have been excluded from the series. *Bohr* (3) and *Saugmann-Jensen* (7) have reported follow-up studies on the non-operated patients. *Saugmann-Jensen* found a total arthrographic error (operated + non-operated) of almost 30 per cent and *Bohr* of almost 20 per cent, *i.e.* the same range as in the present study.

Turner & Wurtz (9) consider arthrography to be unnecessary in clinically definite meniscal injuries, but indicate that it is of some value in patients with clinically "atypical findings". However, they found an arthrographic error of 28 per cent in medial and of 73 per cent in lateral meniscal injuries. (Their material is small, 29 and 11 patients respectively). Since they report only on operative results, they have probably included only the positive arthrographies, while they do not appear to have followed the non-operated patients, presumably with negative arthrographies.

Würdinger & Känel (11) found arthrography to be of value in doubtful cases in which the operation indication was based exclusively upon the arthrographic findings, the patients thus not having operation unless arthrography had been performed. In 60 cases in which the opera-

tion was based solely upon the arthrography, however, they found an error of 26.6 per cent. Therefore, their findings too cannot be taken to indicate that arthrography increases the diagnostic accuracy.

CONCLUSION

It is obvious that the question whether the history and clinical findings indicate operation in the individual cases must vary appreciably from surgeon to surgeon. Considering, however, the marked arthrographic error in clinically doubtful cases, the only conclusion that can be drawn is that the arthrographic inaccuracy is as great as the clinical inaccuracy and that—as also demonstrated in the present study—the diagnostic accuracy is independent of whether or not arthrography is done preoperatively.

SUMMARY

This is a report on a 3-year material comprising 166 patients with clinically doubtful meniscal injuries who underwent arthrography. The arthrographic findings were checked at operation or at follow-up of the non-operated patients. The accuracy of the arthrographic diagnosis is discussed.

To ascertain whether the clinical diagnosis can be altered by doing preoperative arthrography in clinically doubtful cases, two 2-year operative series were compared. In one arthrography was done preoperatively in cases where the clinical findings were doubtful, while in the other series no arthrography was done.

It is concluded that the inaccuracy of the arthrography is as great as that of the clinical examination and that the clinical diagnosis is independent of whether or not arthrography is performed preoperatively.

RESUME

Compte rendu d'un matériel d'observation examiné pendant une période de 3 ans et comprenant 166 malades avec lésions mensicales cliniques douteuses demandant une arthrographie. Les trouvailles arthrographiques ont été vérifiées à l'opération ou par des examens complémentaires chez les malades non opérés. Il est discuté de l'exactitude du diagnostic arthrographique afin de voir si le diagnostic clinique peut être altéré lorsqu'on pratique l'arthrographie, les cas douteux ont été comparés à deux séries opératives de 2 ans. Dans l'une, l'arthrographie avait été pratiquée avant l'opération dans des cas où les trouvailles cliniques

étaient douteuses, alors que dans l'autre série, il n'avait pas été fait d'arthrographie.

Il est conclu que le manque d'exactitude de l'arthrographie est aussi grand que celui de l'examen clinique et que le diagnostic clinique n'a aucune dépendance du fait que l'arthrographie a été pratiquée ou non avant l'opération.

ZUSAMMENFASSUNG

Dies ist Bericht über ein 3-jähriges Material, das 166 Patienten mit klinisch zweifelhaften Meniskusschäden, an denen eine Arthrographie vorgenommen wurde, umfasst. Die arthrographischen Befunde wurden mit denen bei der Operation oder bei der Nachuntersuchung der nicht operierten Patienten verglichen. Die Genauigkeit der arthrographischen Diagnose wird erörtert. Um festzustellen ob die klinische Diagnose in zweifelhaften Fällen mittels Arthrographie verändert werden kann, wurden zwei 2-jährige operative Gruppen miteinander verglichen. In der einen wurde eine präoperative Arthrographie vorgenommen, in Fällen wo die klinische Diagnose zweifelhaft war, während in der anderen keine Arthrographie ausgeführt wurde. Man kommt zur Schlussfolgerung, dass die Ungenauigkeit der Arthrographie ebenso gross wie die klinische Untersuchung ist und dass die klinische Diagnose unabhängig davon ist ob eine Arthrographie vor der Operation ausgeführt oder nicht ausgeführt wurde.

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