Pain in arthroscopic knee surgery under local anesthesia

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Background **We evaluated pain during arthroscopic knee surgery performed under local anesthesia, with respect to various types of lesions and specific procedures used.**

Patients and methods **Arthroscopic surgery was performed on 63 joints (61 patients), with a median age of 49 years. We asked the patients to describe the pain experienced at each step of the procedure, and to compare the level of pain experienced at the time of injection and during the operation, using a visual analog scale (VAS).**

Results **Pain experienced at the time of injection of the local anesthetic was more severe than the pain experienced during the surgical procedure. Local anesthesia provided good pain control during partial resection of the meniscus, chondroplasty, and removal of free bodies. Patients sometimes experienced more pain during treatment of the suprapatellar pouch, including the plica and the anterior cruciate ligament.**

Interpretation **Injection of the local anesthetic was usually the most painful phase of the entire procedure. Patients were generally satisfied with the pain control.**

In recent years, local anesthesia for arthroscopic knee surgery, which is performed on an outpatient basis, has gained acceptance because of its low cost, time saving, and level of safety (Wredmark and Lundh 1982, Fruensgaard and Johannsen 1990, Tsai and Wredmark 1993, Shapiro et al. 1995, Linter et al. 1996, Trieshman 1996). When local anesthesia is used, the surgeon is able to clearly define the pathological lesion and perform a minimal procedure by probing, while asking the patient to describe the quality and quantity of the pain. Some studies have reported, however, that local anesthesia did not suffice in treating pain associated with intraarticular lesions (Shapiro et al. 1995, Jacobson et al. 2000). To address this issue, we evaluated the levels of intraoperative pain experienced during arthroscopic surgery involving different lesions and procedures.

Patients and methods

Patients

Surgery was performed on 63 joints in a total of 61 patients (33 men) with a median age of 49 (16–83) years. Postoperative diagnoses included osteoarthrosis (29), meniscal injury (14), hypertrophic synovitis (9), cruciate ligament injury (6), chondral injury (4), and plica synovialis mediopatellaris (1). The following procedures were performed: partial menisectomy (44), partial synovectomy (29), chondroplasty (17), resection of the plica (6) and removal of free bodies (2). Prior to surgery, informed consent was obtained from all patients who participated in the study.

Methods

Premedication (15 mg pentazocine and 50 mg hydroxyzine hydrochloride) was administered by intramuscular injection 30 min before the patient entered the operating room. Upon arrival in the operating room, patients received an intraarticular injection of 1% lidocaine (20 mL) to the supero-

lateral portion of the knee. After evacuation of the joint effusion, an additional 15 mL of 1% lidocaine with epinephrine (1:100 000) was administrated subcutaneously at the antero-medial and antero-lateral portal sites, including the surrounding fat pad or intraarticular soft tissue. No tourniquet was used. The arthroscopy was performed while we showed and explained the joint pathology to the patient. When there were several pathological lesions in the joint, we identified the primary pathogenesis by probing the lesion and evaluating the quality of the pain. Our goal was to use this information to perform the minimum treatment necessary. The patients' vital signs were monitored for approximately 30 min after surgery while they remained in the recovery room. The patients were allowed to return home, and returned to the hospital for follow-up on the first, third and seventh day after surgery.

In 7 of the patients, we administrated an additional 15 mg of pentazocine during surgery, because these patients experienced moderate to severe pain. The mean duration of arthroscopy was 43 (SD 14) min. Patients experienced more pain when the arthroscopy lasted longer than 60 min. Oral administration of non-steroidal anti-inflammatory (loxoprofen sodium, 120 mg per day) and antibiotic drugs was prescribed for 7 days. We advised patients to use anti-inflammatory drug suppositories when they experienced severe pain. 36 patients used such suppositories after arthroscopic surgery.

Evaluation

During arthroscopy, we asked patients to describe pain at each step of the procedure. Pain was classified as none, mild, moderate, or severe in order to evaluate the grade of pain during the surgical procedures (n = 63). Some patients had had several procedures performed. Immediately after surgery, the surgeon asked patients questions pertaining to pain experienced during the injection of lidocaine and during surgery (no pain, 0; severe pain, 10), to compare the grade of pain between the injection procedure and during the operation. Patients were also asked to describe their satisfaction with the level of pain control during surgery (complete, 0; none, 10), and whether or not the patient would like to have any future arthroscopic knee procedures performed in this way (yes, 0; no, 10) (n = 58). Patients used a visual analog scale (VAS, 1–10) in answering the questions (Lintner et al. 1996).

Statistics

The Mann-Whitney U-test was used for comparing pain between the groups that received different procedures. A Wilcoxon signed-ranks test was used to compare VAS scores describing the pain experienced at the time of injection and during the operation.

Results

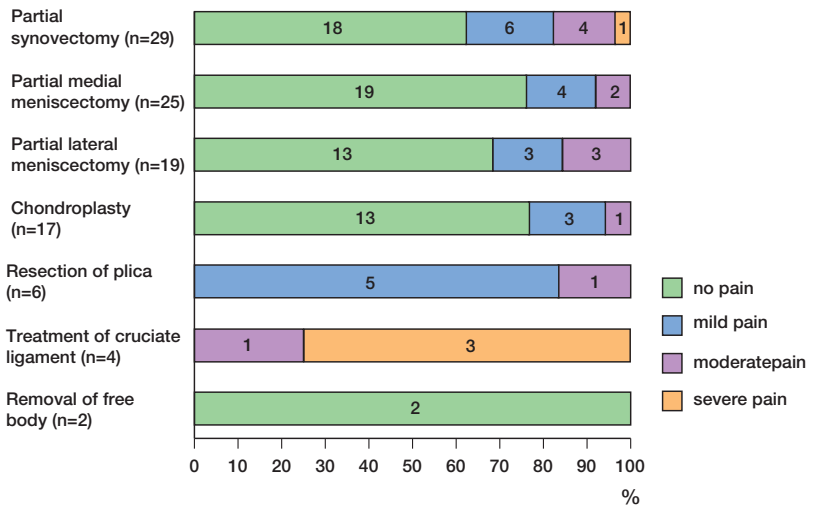
Intraoperative pain experienced during different arthroscopic procedures

None of the patients who had a meniscectomy reported experiencing severe pain during the procedure. Most of these patients experienced no pain, and a smaller number experienced mild or moderate pain (Figure). There was no difference between the degree of pain experienced during medial and lateral menisectomy ($p = 0.6$).

Of 29 patients who underwent partial synovectomy, 1 reported experiencing severe pain, and this patient had undergone partial synovectomy in the suprapatellar pouch. During chondroplasty (17 patients) involving debridement such as resection of flapped injured cartilage and trimming was performed. During treatment of cruciate ligaments partial resection of torn ends or hypertrophy of the end of the rupture (4 joints) was performed.

Intraoperative pain control

Pain experienced during the injection of lidocaine was more severe than pain experienced during the surgical procedure itself ($p < 0.001$). The average VAS score describing pain during the procedure was 2.4, and satisfaction with pain control during the procedure received an average VAS score of 1.4. The average VAS score indicating willingness to undergo future arthroscopic procedures performed in this same way was 1.7. None of the patients experienced any serious complications (Table).



Intraoperative pain experienced during different arthroscopic procedures. In total, 63 surgical procedures were performed as described in Patients and methods. The numbers of each of the procedures performed are indicated on the y-axis. The percentages of patients who experienced no pain (black bars), mild pain (striped bars), moderate pain (shaded bars), and severe pain (open bars), are shown on the x-axis.

Discussion

Few studies have evaluated pain experienced during arthroscopic surgery under local anesthesia with regard to the site and method of treatment. We found that local anesthesia provided good pain control during partial resection of the meniscus, chondroplasty, and removal of free bodies, and that pain was occasionally experienced during partial synovectomy and during the treatment of the suprapatellar pouch, including the plica and cruciate ligament. Dye et al. (1998) reported on the neurosensory mapping of the internal structure of the knee without anesthesia. They demonstrated that severe pain was reported during probing of the suprapatellar capsule, meniscal capsular margin, infrapatellar fat pad, and the insertion site of the cruciate ligament. In contrast, no pain was reported while probing cartilage and the inner rim of the meniscus.

In general, local anesthesia appears to be sufficient to provide nearly pain-free conditions for performance of partial menisectomy and chondroplasty; however, it appears not to suffice for achievement of pain-free resection of the plica and tear end of cruciate ligaments. We conclude that injection is generally the most painful phase of intraoperative pain, and that patients were generally satisfied with the level of pain control that they received. Thus, further steps should be taken to improve the injection method. Alternatively, intravenous sedation could be used to reduce pain experienced during both the injection and the operation. Such approaches would help to control pain adequately during and after certain types of arthroscopic knee surgery.

No competing interests declared.

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Intraoperative assessment of VAS score

Case	Age	Sex	A	B	C	D
1	40	m	5	1	1	0
2	41	m	2	0	0	0
3	52	m	7	1	0	0
4	41	f	4	2	2	0
5	28	m	7	3	2	2
6	17	m	8	8	5	0
7	21	m	2	6	1	5
8	16	m	7	7	5	10
9	22	m	6	7	8	7
10	73	f	6	3	5	10
11	77	f	5	8	3	10
12	66	f	5	5	5	0
13	66	f	8	7	5	0
14	51	m	1	0	1	1
15	40	m	0	0	0	0
16	47	m	8	1	4	5
17	46	f	3	1	0	3
18	38	f	5	10	0	5
19	56	f	1	1	0	0
20	75	m	2	0	0	5
21	60	m	5	0	0	0
22	65	m	5	5	5	0
23	63	m	5	5	4	0
24	65	f	0	0	0	0
25	31	f	2	1	0	0
26	42	f	5	3	0	0
27	39	m	8	1	0	1
28	38	m	3	0	0	0
29	27	m	0	0	0	0
30	79	f	5	5	0	0
31	56	f	6	0	0	0
32	39	f	6	2	1	0
33	18	m	5	1	0	0
34	57	m	0	0	0	0
35	83	m	0	0	0	0
36	71	f	0	0	0	0
37	44	m	2	0	0	0
38	44	m	5	0	2	0
39	76	f	1	2	1	0
40	68	f	2	0	0	10
41	58	f	0	0	0	0
42	64	m	2	0	0	0
43	75	m	1	1	1	1
44	28	m	6	0	0	0
45	59	f	5	2	0	0
46	43	f	5	4	0	0
47	64	f	0	0	0	0
48	19	f	10	8	5	5
49	39	m	3	6	1	5
50	56	f	5	5	5	6
51	64	m	3	3	2	0
52	74	m	0	0	0	0
53	37	f	10	5	0	2
54	64	m	0	0	0	0
55	72	m	2	2	0	0
56	42	f	4	2	0	0
57	26	f	6	0	0	0
58	28	m	5	5	5	5
Mean	49		3.9	2.4	1.4	1.7
SD	19		2.8	2.8	2.1	3
Median	49		5	1	0	0

A Pain of injection
B Pain during operation
C Satisfaction for operation
D Next time operation in this way

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