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Complications in knee arthroscopy

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Abstract All simple arthroscopic procedures during 1999 through 2001 performed at Baerum community hospital were retrospectively examined. Procedures were excluded when being part of more complex procedures. A total of 876 procedures performed on 785 patients were left for examination. Complications were registered from the patient record and all received a written questionnaire or phone call. The answer was obtained from 97.6%. The overall complications rate was low, giving total of 5.00%. A total of 0.68% of the complications had therapeutic consequences. There were two superficial infections, one thromboembolic event/pulmonary embolus and one reoperation due to scar tissue. Other complications were considered minor, and had none or little consequence for the patient comprising preoperative bradycardial episodes, asthmatic events, subcutaneous infusion of total intravenous anaesthetics (TIVA), instrument breakage and conversion to arthrotomi. Postoperatively registered complications included swelling, haemarthros, portal bleeding and fistulation, temporary sensory loss and longstanding pain. Duration of surgery was the only predicting factor for postoperative complications. Simple arthroscopic surgery is safe and has few serious complications. The use of TIVA or tourniquet does not increase the morbidity or complication rate, and prophylaxis against thromboembolism was not necessary.

Keywords Arthroscopy · Knee · Complications · Thromboembolic event · Anaesthetics

Introduction

There has been a steady rise in arthroscopic knee surgery in the last decades. It accounts for approximately 50% of out-patient orthopaedic surgery in Norway and between 18,000 and 19,000 procedures (4.3/1,000 inhabitants) are performed annually [12]. Known serious complications includes septic arthritis, thromboembolic events, complex regional pain syndrome (CPRS) and vascular injury [2, 3, 7, 10, 14, 15]. The complication rate has been reported to vary with the age of the patient, the length of the tourniquet time [11] and the complexity of the procedure [1].

The aim of this study was to examine the complications of the simple arthroscopic knee surgery procedures performed at Baerum hospital. We have made a retrospective study to evaluate the overall complication rate with a special attention to the serious complications and related long-term morbidity. Baerum Hospital is a local hospital for approximately 150,000 inhabitants.

Materials and methods

All arthroscopic knee procedures during 1999 through 2001 were included, using the hospital's patient data administration program (Infomedix). Patients were excluded if the arthroscopic procedure was a part of more complex procedures such as anterior cruciate ligament reconstruction, transplantation of cartilage, treatment of fractures or primary septic arthritis. After exclusion, a total of 876 procedures were performed on 785 patients over the 3 years. Patients were mainly treated on an outpatient basis and all surgeons of the department carried out knee arthroscopies.

The type of anaesthesia, operation time, use of tourniquet, intraoperative complications, use of anticoagulation and postoperative contacts were registered from the patient record. Patients'complaints within the first 8 weeks and which related to the operated knee were considered as complication. Reoperation due to knee pathology was not considered as a complication.

The included patients received a written questionnaire and non-responders were contacted by phone. The questionnaire included general complications, infections, re-operations and current status concerning function and swelling of the knee and calf. Mortality registrations of the included patients and general survival statistics of an age- and sex-matched population were obtained from Statistics Norway. The study was approved by the Regional Ethics Committee for Medical Research and necessary permissions were granted from The Data Incorporate and the Norwegian Health Department. SPSS version 12.0.1 was used for statistical analysis, a P value ≤ 0.05 was considered significant. Chi-square or Fisher's exact test (when expected number < 5) where used for categorical data, and student t-test for continuous data (normal distributed or normal distributed when log transformed).

During follow-up, six patients died, none of them in the postoperative period, or from related causes.

We obtained contact with the patient in 848 out of 876 procedures. All patients that did not answer the questionnaire or telephone contact had been to a follow-up appointment in the postoperative period, thus giving a total follow-up of 100% (Table 1).

Table 1 Patient follow-up

	Number	Percentage
Completed questionnaire	558	63.7
Telephone contact obtained	290	33.1
Total	848	96.8
Follow-up appointment within 6 months after surgery	555	63.4
Follow-up, questionnaire or telephone contact	876	100

Table 2 Anticoagulation therapy

Anticoagulation	Number	Percentage
Dalteparin 2,500 IE preoperatively	642	73.3
Dalteparin 5,000 IE preoperatively	16	1.8
Acetylsalicylic acid preoperatively	1	0.1
Warfarin preoperatively	4	0.5
Unknown	3	0.3
No anticoagulation	210	24

The median observation time was 3.31 (range 2.12–5.08) years, median age 48.0 (16–87) years, 43% of the procedures were performed on women.

A total of 788 (90.0%) procedures were performed using total intravenous anaesthetics (TIVA), a combination of propofol and strong opiods like fentanyl, 81 (9.2%) using spinal anaesthetics and seven procedures (0.8%) had no record of type of anaesthetics. Spinal anaesthesia was preferred for the older patient group (mean 55.9 years) compared with the TIVA group (mean 47.7 years).

The anticoagulation therapy is shown in Table 2. During 1999 and 2000, we started using dalteparin preoperatively as routine prophylaxis. Arthroscopies performed before this change of routine did not receive prophylaxis against thrombosis. Five patients were using antithrombotic medication preoperatively and did not receive dalteparin. Dalteparin 5,000×1 was used for overweight patients, there was no absolute limit.

The duration of the surgery was median = 22.0 (5–165) min, information lacking from three procedures.

The main operating procedures consisted of 704 (80.4%) meniscectomies, 61(7 0%) partial synovectomies (including removal of plicas and septum) and 111 (12.7%) pure diagnostic arthroscopies. A total of 7.2% of the meniscectomies were of the lateral meniscus, 2.9% were of both lateral and medial (Table 3).

Main diagnoses after surgery are shown in Table 4. A total of 29.8% had more than one knee diagnosis.

Results

We registered 44 (5.0%) complications in 43 procedures, 10 preoperative and 34 postoperative (Table 5).

Table 3 Main operating procedure

	Number	Percentage
Medial meniscectomy	616	70.3
Lateral meniscectomy	63	7.2
Lateral and medial meniscectomy	25	2.9
Partial synovectomy (incl. plica and septum removal)	61	7
Diagnostic arthroscopy	111	12.7
Total	876	100

Table 4 Main diagnoses after surgery

	Number	Percentage
Meniscus tear	647	73.8
Anterior cruciate ligament tear	34	3.9
Tibiofemoral arthrosis	57	6.5
Synovitis, plica or septum disorder	75	8.6
Patellofemoral disorder	11	1.3
Cartilage injury	4	0.5
Other	41	4.6
Normal knee	7	0.8
Total	876	100

Eight complications were related to the anaesthesia. One patient was diagnosed with lymphangitis related to a venous canula; he was treated with peroral antibiotics for 10 days. The others were treated during the procedure and the incidents led to no further consequence for the patients.

Of the complications related to the procedure, six (0.68% of all procedures) had therapeutic consequences. Two meniscectomies were converted to arthrotomies, one due to technical difficulties and one due to instrument breakage. In the latter case, the patient was diagnosed with deep venous thrombosis (DVT) and pulmonary embolism 6 weeks after surgery. He was treated with warfarin (Marevan) for 6 months. Further investigations of the patient did not reveal any thromboembolic disposition. One patient had a superficial infection in the suprapatellar irrigation portal and received oral antibiotics for 10 days. One patient developed a flexion deficit and was reoperated arthroscopically with scar-tissue removal from the suprapatellar pouch. He had a normal range of motion one year after primary surgery. One patient with a painful haemarthros was drained two times with a canula and had a normal progression after drainage. Of the 11 patients with complaints of knee swelling in the postoperative period, four were investigated with venography or ultrasound with negative results. Eight of these patients did not report knee or calf swelling at follow up. One did not reply.

At follow-up, 43 patients reported persistent swelling of the knee (38) or calf (5). A total of 14 of these had knee arthrosis.

There was a statistically significant association between operation time and (1) intraoperative surgical complications ($P = 0.016$) and (2) postoperative complications ($P = 0.02$). There was no association between operation time and anaesthesiological complications. There was an association between the age of the patient and (1) preoperative anaesthesiological complications towards the older patient group having more problems, but the difference was not significant ($P = 0.074$) and (2) intraoperative surgical problems, wherein the tendency was towards the younger having more problems, but was not significant. ($P = 0.14$). There was a weak association between age and postoperative complication ($P = 0.18$), the younger having more complications.

There was a tendency for a higher risk for minor anaesthesiological problems when using spinal anaesthesia ($P = 0.13$).

There was no association between use of tourniquet and (1) postoperative problems, (2) infection rate or (3) pulmonary embolus. Nor was there any association between routine anticoagulation (dalteparin 2,500 IE s.c.×1) and thromboembolic event, or between operation

Table 5 All complications

	Event	Number	Percent of all procedures	Treatment	Long-term sequela
Peroperative	Bradycardia, pulse <40/min	3	0.34	Atropin	None
	Vasovagal reaction	1	0.11	Pressor	None
	Hypooxygenation	1	0.11	02-supply	None
	Asthmatic event	1	0.11	Bronchiolytica	None
	Subcutaneous infusion of TIVA	1	0.11	Stop infusion	None
	Instrument breakage	2	0.23	Both removed during the procedure, one (a) had to be converted to arthrotomy	(1) Later diagnosed with DVT/pulm. embolus (below); (2) none
	Conversion to arthrotomy	1	0.11	None	None
Postoperative	Longstanding pain	9	1.03	Analgetic medication	None
	Haemarthros	4	0.46	One drainage	None
	Swelling of the knee	11	1.26	None	Two long-term swelling
	Bleeding from portal	3	0.34	Suture and compression	None
	Synovial fistula	2	0.23	Suture and compression	None
	Contracture	1	0.11	Arthroscopy with scar tissue removal	None
	Sensory loss medial calf	1	0.11	None	None
	DVT/pulmonary embolus	1	0.11	Warfarin (6 months)	Permanent leg swelling
	Superficial infection	2	0.23	Peroral antibiotics (10d)	None
	Total	44	5.00		

time and event ($P = 0.17$). The only patient who was registered with thromboembolic event received 2,500 IE dalteparin s.c. preoperatively.

The overall mortality from of the included patients was 0.42 comparing with an age- and sex-matched population. These comparisons were executed by the National Bureau of Statistics/Statistics Norway.

Discussion

We have included all minor incidents and patients' complaints. We found a low overall complication rate. A different prospective study design may have revealed a higher complication rate. We do however believe that the serious incidents were recorded due to the high follow-up rate (97.5% when excluding the deceased.) The questionnaires and telephone contact did not reveal any unknown complications, and only a minor part of the complications reported in the postoperative period was remembered by the patients at follow-up (10 out of 41 registered complications from the patients who answered).

There have been several prospective reports with an emphasis on a high incidence of ultrasound-diagnosed DVT when performing the knee arthroscopy. Michot et al. [9] found an incidence of 15.6% of ultrasound-diagnosed DVT after knee arthroscopy in a prospective study of 133 knees. The patients were randomized to dalteparin 5,000 IE daily for 30 days or placebo and the incidence was 1.5 and 15.6%, respectively. One pulmonary emobolus was diagnosed in the dalteparin group, this was the only patient with symptoms of thromboembolic event. Eight out of ten DVTs in the control group were limited to calf muscular veins only (6) or calf muscular and axial calf (2) veins. Similar results have been demonstrated by Wirth et al. [13]. In their prospective study 239 patients were randomized to reviparin 1,750 IE×1 or placebo for 7–10 days. There were five DVTs in the control group and one in the treatment group, diagnosed by compression colour-coded sonography. All DVTs were distal, two including the popliteal trifurcation, three having symptoms. The clinical significance of these DVTs is however uncertain. Macdonald et al. [8] followed isolated intermuscular DVTs of gactrocnemicus and soleus muscle veins untreated for 3 months with ultrasound. Only 3% propagated further, none above the popliteal level. A total of 46% were completely resolved after 3 months, 38% partly resolved or remained stable intermuscular. Cancer was the only prognostic factor for propagation.

Kearon et al. [6] claimed that 10% of symptomatic DVTs develop a severe postthrombotic syndrome characterized by permanent swelling, pain and skin changes which may progress to repetitive ulcers and new DVTs.

Of interest in our findings is the low symptomatical rate of DVTs and the low incidence of calf swelling at follow-up. Seven patients were examined during the first 5 weeks with venography and/or ultrasound on suspicion of calf/thigh venous thrombosis, with negative findings. All had received 2,500 IE dalteparin preoperatively. Five patients reported calf swelling at follow-up but they reported no secondary related symptoms from their calf swelling. Our hospital had no systematical follow-up after surgery, only 63.7% were in contact with us during the first 6 months. Symptomatical DVTs may be interpreted as a part of a prolonged rehabilitation by our patients, and stayed undiagnosed. We could however not detect any additional morbidity for the patients at follow-up.

The use of TIVA has increased mainly due to shorter preoperative time, shorter postoperative observation time at the same cost as spinal anaesthesia [4, 5]. The conversion from spinal anaesthetics to TIVA as preferred method for out-patient anaesthesia in our hospital did not increase the complication rate, and both methods have a very low incidence of complications. The patient population being healthy is confirmed by the mortality registration, and this could contribute to the low findings of anaesthesiological complications.

Conclusion

Simple arthroscopic knee-surgery is safe, and has a low rate of complications. The use of TIVA does not increase morbidity or complications rate. Antithrombotic treatment does not seem indicated.

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