enzyme tests done, 30 underwent ultrasonographic examination of the liver and 29 underwent serological testing for viral hepatitis. The results from the hepatology consult did not influence the management of these 34 patients with respect to delay/cancellation of surgery or changes in the anaesthesia plan.

In this retrospective study, patients with elevated preoperative ALT and AST showed no significant changes in these levels after surgery. In fact, we observed a non-significant downward trend in these enzyme levels at our early and late postoperative time points. It is generally believed that, in patients with liver disease, the nature and severity of the underlying liver pathology and the type of surgery performed are the main determinants of postoperative outcome [2]. We found that patients who underwent abdominal operations had significantly higher postoperative ALT levels than those who had non-abdominal surgeries. In line with this, several investigators have identified abdominal surgery as a perioperative risk factor for patients with liver disease [2–5]. Ziser and colleagues [4] undertook a retrospective evaluation of perioperative risk factors in patients with liver cirrhosis, and found that factors such as occurrence of intraoperative complications and high ASA rating were associated with higher risk of perioperative complications and greater risk of death. Our analysis indicated that neither of these two factors was associated with significantly higher postoperative ALT and AST levels in our patients. However, the subgroup

without intraoperative complications and the subgroup with ASA class I–II patients were the only groupings that showed significantly lower postoperative ALT and AST levels than their respective counterparts. These findings support previous claims that patients with poorer physical status and those who develop intraoperative complications are more vulnerable to deterioration of liver function due to anaesthesia and/or surgery.

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Is administration time of oral non-steroid anti-inflammatory drugs important? A clinical study in patients undergoing arthroscopic subacromial decompression

EDITOR:
Multi-modal pain management is the modern standard of care for day-surgery, but the influence of timing for the different analgesic drug components

is still an open question. Chung has suggested that pre-emptive analgesia should be given to all patients unless there are specific contraindications [1]. The clinical benefit of preoperative non-steroid anti-inflammatory drug (NSAID) administration has, however, been argued [2]. In a recent meta-analysis, clear benefit was found for pre-emptive administration of epidural analgesia and local wound infiltration, but it was far less convincing for NSAIDs [3]. The aim of the present study was to

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compare whether there are clinically important differences between administering the oral NSAID component of the multi-modal analgesia protocol just before the start of surgery compared with administration right after the end of surgery.

Patients ($n = 64$, ASA I–II) undergoing elective arthroscopic subacromial decompression under general anaesthesia were studied after ethical approval and informed consent. Forty-one males and 23 females (mean age 55 ± 10 yr; weight 80 ± 14 kg) were randomly allocated (sealed envelope) to receive an oral anti-inflammatory drug (etoricoxibe 120 mg) administered before or after surgery.

A standardized perioperative protocol was followed. No pre-medication apart from oral cyclozine 50 mg 30 min before anaesthesia was given. Intravenous (i.v.) access and a balanced glucose solution were started upon entry into the operating theatre. Before induction, bethamethasone 8 mg i.v. was given followed by induction with fentanyl 100 µg and propofol titrated to hypnosis. All patients had a laryngeal mask inserted. Maintenance of anaesthesia was provided with sevoflurane in nitrous oxide $1:2$ L min^{-1} titrated to clinical needs. No muscle relaxants were given. Before incision, all patients received lidocaine with epinephrine locally into the skin, port and intra-articularly by the orthopaedic surgeon (20 mL lidocaine 10 mg mL^{-1}). All surgery was performed arthroscopically by one of two staff orthopaedic surgeons with the patient placed in a beach chair position. At the end of surgery, 20 mL bupivacaine 5 mg mL^{-1} along with morphine 4 mg was injected intra-articularly. Upon arrival in the recovery area, all patients received paracetamol 1 g i.v. (Perfalgan®; Bristol-Myers Squibb AB, Gustavlunds vagen, Sweden). Rescue analgesia was provided with opioids on request or when pain score was >4.

All patients, when discharged, were provided with etoricoxibe 120 mg once daily for the first 4 postoperative days combined with paracetamol 1 g 4 times daily and were also given dextropropoxyphene tablets (100 mg) as rescue analgesia. Patients were informed to continue taking the anti-inflammatory therapy for the first 4 days and to take rescue analgesia as needed. They were also informed about a telephone follow-up 4 days after discharge.

The primary study end-point was pain assessed by the visual analogue scale (0–10) during the early postoperative period while still in hospital. Secondary study variables were the need for rescue medication during the hospital stay, before discharge, the need for rescue analgesia (number of tablets) during the first 4 postoperative days and pain at rest in the early morning on postoperative days 1 and 4.

Differences between groups were studied with ANOVA and the χ^2-test. Power analysis for the primary end-point, based on earlier experience, estimated that 32 patients in each group would be required. This assumed pain scores ranging from 4 to 5, a minimal relevant difference in pain of 2, and a standard deviation of 2 with a two-tailed value of $\alpha = 0.05$ and a power of 90. StatView +SE on a MacIntosh computer was used as statistics.

Patient characteristics were comparable in the two groups. Surgery and anaesthesia were uneventful, and all patients were discharged within 5 h in accordance with departmental routines. There were no differences in grading of pain at 30, 60 or 90 min after surgery for the two groups studied (Table 1). Thirty minutes after arrival in the recovery room, 28 patients (44%) scored their pain as >4, with no difference between groups (15 vs. 13 patients for the before and after groups, respectively). At 90 min after surgery, only 10% had a pain score >4 (3 in each group). Five patients had a pain score of 5 and one had a pain score of 8. Overall, 53% of patients required rescue analgesia in the recovery area, with no difference between the groups (Table 1). Nine patients required therapy for postoperative nausea and vomiting, with no difference between the groups. No difference was seen in the time to discharge. During the follow-up interviews, no differences were found with respect to pain, the need for rescue analgesia or general discomfort (Table 1).

In this study, we hypothesized that starting the oral NSAID administered before rather than after surgery would provide better postoperative analgesia. We studied patients undergoing arthroscopic acromioplasty, a procedure known to be associated

Table 1. Pain scoring and rescue analgesics during in-hospital recovery after arthroscopic acromioplasty.

	Before ($n = 32$)	After ($n = 32$)
Pain score		
30 min after surgery	$4.1 + 2.8$	3.3 ± 2.8
60 min after surgery	3.7 ± 2.1	3.6 ± 2.4
90 min after surgery	3.2 ± 2	2.5 ± 1.8
No rescue analgesia in-hospital	12	18
In-hospital rescue analgesia	16/4	12/2
In-hospital anti-emetics	4	5
VAS after 24 h	3.4 ± 2	3 ± 1.6
No need for rescue analgesia during 1st 24 h	71%	75%
VAS after 96 h	2.5 ± 1.5	2.9 ± 1.3
No need for rescue analgesia (2–4 days)	94%	90%

VAS: visual analogue scale

with considerable pain. All patients received the complete multi-modal analgesia protocol and the only variable differing was the randomization to receive the same NSAID dose either before or after surgery. This is a negative study; we could find no differences between the two groups in the early need for postoperative rescue analgesia, pain score or overall pain.

Etoricoxibe is one of the more selective cyclooxygenase 2 inhibitors presently available for oral administration. The bioavailability for etoricoxibe is almost 100% and the peak plasma concentration is generally seen within 1 h after oral intake. Absorption is slowed somewhat when the tablet is taken with food. It has been shown earlier to be more effective than placebo when administered before the start of surgery [4].

The effect of oral 'coxibs' administered before vs. after surgery has not been extensively studied. Most studies have compared active therapy, coxibs with placebo and not included a postoperative group of patients. Our results are contrary to those of Ruben who found that rofecoxib 50 mg orally had a significant sparing effect on rescue analgesics when given before knee arthroscopy [5]. In a large study with hospitalized patients, Riest found preoperative rofecoxib 50 mg administered orally to be modestly better than postoperative administration and concluded that postoperative administration is useful [2].

There are, of course, limitations with our study. It is important to bear in mind that we did not include any control group. The time between administration and induction was relatively short, about 20 min. The absorption of NSAID may not be optimal in the preoperative phase or during anaesthesia. It is also important to keep in mind that we used a multi-modal pain programme, including preoperative steroids. Breivik and colleagues recently showed that steroids are more effective than parecoxib; both drugs, however, are more effective than placebo, all administered before surgery [6]. Furthermore, all patients received local anaesthesia both at the start and end of surgery. Post-surgical local anaesthesia was combined with a small dose of opioids, further diluting the potential early postoperative effect. The only variable differing between the groups was the time for start of the oral NSAID administration. It may not be surprising that this did not have a major impact on the early postoperative period; however, we observed no benefit during the entire 4-day study period in any

other variable studied. One may argue that the study is underpowered, but not even a trend in favour of the pretreatment group was seen. The number of patients requiring rescue analgesia was in line with our expectations of 55–60% needing rescue during the recovery period.

In conclusion, we found no apparent benefit in administering oral NSAID before rather than after day-surgery as part of routine multi-modal pain therapy.

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