placebo with no difference in blood loss [3]; it is morphine-sparing with earlier return to activity [4]. We could not locate any published studies on parecoxib in children. Parecoxib has been found to be as effective as 12 mg morphine, and possibly superior to 6 mg morphine for laparotomy in adults [5]. Gastric and haematological side-effects are less common with parecoxib for many types of postoperative pain [6]. The Australian Adverse Drug Reactions Bulletin [7] has recommended approval for a single dose of parecoxib. Our study shows that single-dose parecoxib is a suitable and superior alternative to fentanyl for corneal suturing with longer postoperative comfort, less postoperative nausea and vomiting and no observed adverse effects. However, efficacy of i.v. vs. rectal NSAIDs and safety need to be evaluated in larger paediatric groups before parecoxib can be proclaimed to have any real benefit.

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Anaesthesia and surgery in patients with abnormal preoperative liver enzymes

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EDITOR:
There is little information about how anaesthesia and surgery affect individuals who have mild liver pathology but exhibit abnormal liver enzymes. Some authors have suggested that additional laboratory studies in such cases may increase perioperative costs unnecessarily and cause cancellations or delays in busy operating rooms [1].

The aim of this retrospective study was to evaluate how liver enzymes are affected by anaesthesia and surgery in patients who have elevated liver enzymes preoperatively but show no signs of advanced liver disease or cirrhotic changes. We also studied a subgroup of these patients who underwent a hepatology consultation to see whether this influenced patient management.

After receiving approval from the Institutional Research Committee on Clinical Studies, we reviewed the charts of all patients who underwent surgery at Baskent University, Ankara Hospital between January 2000 and December 2004. All cases that featured abnormal preoperative liver enzymes were selected.

A patient was considered to have abnormal preoperative liver enzyme results if the serum level of aspartate aminotransferase (AST) or serum alanine aminotransferase (ALT) was more than 1.5 times higher than the upper limit of normal in the week prior to surgery. Cases with advanced liver disease and signs and symptoms of cirrhosis were not included. For each case, we recorded baseline (preoperative), early postoperative (within the first 48 h) and late postoperative (20–40 days after surgery) AST and ALT levels. We also recorded patient

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characteristics, comorbidities, suspected cause of the abnormal liver enzymes, whether a hepatology consultation had been performed and whether this resulted in surgery cancellation/delay, type of operation, type and details of anaesthesia (including ASA classification and intraoperative complications, serum alkaline phosphatase (ALP), gammaglutamyl transferase (GGT) and lactate dehydrogenase (LDH)).

All values are presented as mean ± standard error of the mean (SEM) or number. For independent variables, statistical analyses were performed using the *t*-test or the *U*-test, as appropriate. Dependent variables were analysed with the paired samples *t*-test or the Friedman and Wilcoxon signed rank sum tests, as appropriate. For all determinations, $P < 0.05$ was considered significant.

Ninety-one patients (34 females) were included in the analyses. Patients' age and body mass index (BMI) were 48.0 ± 2.3 yr and $24.5 \pm 0.7\,kg\,m^{-2}$, respectively. The frequencies of ASA class I, II, III and IV were 34%, 35%, 29% and 2%, respectively. The causes of liver enzyme elevation were unknown in 42 patients, 13 had viral hepatitis, 12 had non-alcoholic liver disease, 7 had alcohol-induced liver disease, 5 had biliary disease and 2 had liver congestion. Twenty-six patients developed a total of 27 intraoperative complications (hypotension $n = 18$, hypertension $n = 2$, bradyarrhythmia $n = 3$, tachyarrhythmia $n = 1$, hypoxaemia $n = 2$ and apnoea $n = 1$).

None of the patients developed liver failure or required a prolonged hospital stay for postoperative problems related to liver dysfunction. There were no significant differences between the preoperative enzyme findings and those recorded at the early and late postoperative time points (Table 1). Means for each of the three time points were also compared with patients divided into subgroups according to the type of anaesthesia (general ($n = 52$) vs. regional ($n = 39$)), anatomic site of the surgery (abdominal ($n = 17$) vs. non-abdominal ($n = 74$)), presence ($n = 26$)/absence ($n = 65$) of intraoperative complications and ASA class (1/2 ($n = 63$) vs. 3/4 ($n = 28$)). The only mode of categorization that revealed a significant difference between groups was anatomic site of surgery. The patients who underwent abdominal surgery had a significantly higher mean ALT level at the late postoperative time point than those who underwent non-abdominal surgeries (103.3 ± 42.7 vs. $47.5 \pm 10.4\,UI\,L^{-1}$, $P = 0.037$).

The data for the above subgroups were also analysed for within-group liver enzyme changes, and this revealed several significant changes over time. With respect to the site of surgery, only the subgroup that underwent non-abdominal surgery showed a significant drop in ALT from baseline to the early postoperative time point (77.9 ± 5.6 vs. $60.8 \pm 5.2\,UI\,L^{-1}$, $P = 0.006$). There were no significant changes in mean ALT or AST levels over time for the subgroup that developed intraoperative complications. Patients who did not develop these problems showed significantly lower mean ALT and AST levels at the early postoperative time compared to baseline (85.0 ± 6.6 vs. $66.4 \pm 6.8\,UI\,L^{-1}$ and 76.8 ± 5.7 vs. $59.7 \pm 7.3\,UI\,L^{-1}$, respectively, $P \leqslant 0.015$ for both). Patients who were ASA I or II showed significant decreases in ALT and AST levels from baseline to the early and late postoperative time points (83.6 ± 6.6, 63.8 ± 8.3 vs. $57.3 \pm 15.1\,UI\,L^{-1}$ and 76.8 ± 5.5, 64.6 ± 11.6 vs. $46.9 \pm 10.2\,UI\,L^{-1}$, respectively, $P \leqslant 0.006$ for all comparisons). In contrast, there were no significant differences among these measurements in the group of patients who were ASA class III or IV. The subgroup that had general anaesthesia and the subgroup that received regional anaesthesia showed no significant changes in their mean liver enzyme levels over the three time points.

Thirty-four patients underwent a preoperative hepatology consultation. Thirty-one of these individuals had a second round of preoperative liver

Table 1. Perioperative liver enzyme and bilirubin results for the patients' data are mean ± SEM. The figure in parentheses is the number of patients in that group.

	Preoperative	Early postoperative	Late postoperative
ALT ($UI\,L^{-1}$)	81.0 ± 5.2 (91)	68.2 ± 7.3 (91)	58.2 ± 11.9 (91)
AST ($UI\,L^{-1}$)	74.2 ± 4.4 (91)	68.2 ± 9.3 (91)	59.7 ± 14.8 (91)
GGT ($U\,L^{-1}$)	180.6 ± 35.6 (62)	155.6 ± 34.9 (51)	149.3 ± 26.6 (26)
ALP ($U\,L^{-1}$)	341.3 ± 46.5 (57)	281.7 ± 41.6 (49)	340.5 ± 73.4 (25)
LDH ($U\,L^{-1}$)	528.0 ± 39.1 (23)	489.1 ± 44.2 (15)	459.9 ± 45.6 (8)
Total bilirubin ($mg\,dL^{-1}$)	1.05 ± 0.14 (65)	0.95 ± 0.12 (55)	0.90 ± 0.15 (19)

AST: aspartate aminotransferase; ALT: alanine aminotransferase; ALP: serum alkaline phosphatase; GGT: gammaglutamyl transferase; LDH: lactate dehydrogenase.

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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

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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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