confined to one or adjacent segments of the spinal cord [2]. Many aspects of bilateral presentation or recurrences of the syndrome are unknown, and, for this reason, 1183 consecutive patients with syndrome were analysed [3]. In 10 patients, the syndrome started in symmetrical limbs, in 34, it recurred in the same limb after a period of no or few complaints, and in 76, it recurred in one or more limbs other than the first limb. Involvement of a second limb concerned the symmetrical limb in 47%. The diagnosis of RSD was in one report based on four of five symptoms: pain, oedema, altered skin temperature, altered skin colour or reduced range of motion extremity [4]. These criteria are controversial [5]. Our patient had pain in all four limbs and this is the main symptom for diagnosis of CRPS [5]. Swelling or oedema of the affected limb is also reported to be characteristic; however, in a large prospective trial, only a history of swelling was needed even though the examination did not reveal the swelling [4]. No skin colour change was reported by our patient. In one study, 70% of the patients reported skin colour changes; however, examiners found absence of colour change in 69% of the patients [6]. Our patient met all the diagnostic criteria for CRPS type I. He also developed psychological problems, which are often found in these patients; this may lead to the conclusion that psychological problems may play a role in the pathogenesis of the disorder [7]. Our patient improved over the years with pharmacological treatment, sympathetic blocks and psychological therapy. In conclusion, despite many reports on RSD, there remains much controversy about the disorder. There is no convincing evidence that a primary organic dysfunction of the nervous system exists.

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Endocrine response to cataract surgery under total intravenous anaesthesia, local anaesthesia under sedation or local anaesthesia alone: a comparative study

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EDITOR:
There is evidence that cataract surgery, although a minor operation, elicits a neuroendocrine response. So far, the attempts to correlate stress response with cataract surgery have been focussed mainly on cortisol, glucose and catecholamine release [1,2]. On the other hand, it has been reported in the literature that surgical operations and diagnostic procedures under either general anaesthesia or sedation are associated with a transient increase in serum prolactin levels [3] or an increase in thyroid-stimulating hormone (TSH) levels [4]. The present study was conducted to compare the influence of local anaesthesia alone or under sedation with propofol vs.

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Table 1. Prolactin, TSH and cortisol levels prior to induction of anaesthesia (baseline) and at 4, 6, 8, 10, 20, 60 and 120 min.

	Baseline	4 min	6 min	8 min	10 min	20 min	60 min	120 min
Prolactin (ng mL^{-1})								
LA&S	9.8 (6.3)	10.1 (5.6)	10.7 (5.8)	11.1 (6.0)	10.7 (5.9)	10.7 (6.1)	12.9 (7.7)	9.8 (7.0)
GA	6.8 (4.2)	12.4 (4.3)	16.3 (4.6)*	18.8 (4.8)**	20.5 (4.7)**	21.0 (4.8)**	21.6 (4.9)*	20.9 (4.5)**
LA	9.5 (4.1)	10.4 (4.9)	10.5 (5.1)	10.5 (5.3)	10.3 (5.1)	9.7 (4.7)	13.1 (8.5)	11.3 (6.3)
TSH (μIU mL^{-1})								
LA&S	1.25 (0.5)	1.19 (0.5)	1.19 (0.6)	1.19 (0.5)	1.16 (0.5)	1.16 (0.5)	1.06 (0.5)	0.97 (0.4)
GA	1.43 (0.7)	1.88 (0.7)*	2.16 (0.7)**	2.34 (0.6)**	2.5 (0.6)**	2.5 (0.7)**	2.3 (0.8)**	2.08 (0.9)**
LA	1.22 (0.7)	1.14 (0.7)	1.16 (0.7)	1.13 (0.6)	1.1 (0.6)	1.07 (0.6)	1.01 (0.5)	0.87 (0.4)
Cortisol (μg mL^{-1})								
LA&S	13.8 (10.3)	13.3 (10.5)	13.9 (10.5)	13.8 (10.6)	14.1 (10.5)	13.5 (10.8)	14.5 (10.3)	14.0 (9.5)
GA	11.7 (5.1)	16.0 (4.6)	18.1 (3.9)	20.5 (4.0)	22.8 (3.9)§	24.3 (4.3)§	24.6 (3.8)§	23.5 (4.1)§
LA	14.2 (14.4)	14 (14.6)	15.1 (14.5)	15.3 (14.2)	16 (14.01)	15.7 (14.0)	15.2 (14.2)	14.8 (14.6)

Data are presented as mean (SD). $^{*}P < 0.01$, $^{**}P < 0.001$ and $^{§}P < 0.05$ vs. groups LA&S and LA.
LA&S: local anaesthesia and sedation; GA: general anaesthesia; LA: local anaesthesia.

general anaesthesia provided by total intravenous anaesthesia (TIVA) with propofol on prolactin, cortisol and TSH release during and after cataract surgery.

Sixty postmenopausal women, American Society of Anesthesiologists Grade I–II, aged 50–60 yr, scheduled for extra-capsular cataract extraction surgery as day case patients, were randomly assigned into three groups after institutional approval and patients' informed consent had been obtained. Patients with endocrine and metabolic disorders and patients with systemic use of drugs that block the dopaminergic system, such as metoclopramide, droperidol or haloperidol, were excluded from the trial. In the first group (LA&S), intravenous (i.v.) sedation was given with propofol 1 mg kg^{-1}, immediately before performing local anaesthesia. Neural block was undertaken with a mixture of equal volumes of 2% lidocaine and 0.5% bupivacaine: 3–4 mL were injected as a retrobulbar block, and 8–12 mL were injected at the periorbital region in order to block the facial innervation of the orbicularis muscle. In the second group (GA), anaesthesia was induced with propofol 2 mg kg^{-1} i.v. and tracheal intubation was performed after administration of atracurium. Anaesthesia was maintained by continuous infusion of propofol 6 mg kg^{-1} h^{-1} and neuromuscular block by continuous infusion of atracurium 1 mg kg^{-1} h^{-1}. All infusions were discontinued 15 min before the completion of surgery (closure of the conjunctiva). In the third group (LA), neural block was performed in the manner described above. All patients inspired 33% oxygen-enriched air. Standard non-invasive monitoring was used.

Blood samples were taken prior to anaesthesia (baseline T1) and at 4, 6, 8, 10, 20, 60 and 120 min after induction of either general or local anaesthesia for up to 2 h postoperatively in order to determine prolactin, TSH and cortisol levels (ELISA immunoassay E.S. 300 Analyser, Boehringer Mannheim, Germany). Normal values in our laboratory are 6–20 ng mL^{-1} for prolactin, 0.23–4 μIU mL^{-1} for TSH and 12–25 μg mL^{-1} for cortisol.

We tested the hypothesis that a 30% difference in hormonal levels would give us a clinically significant result. Based on results from a pilot study including five patients for each group and given a type I error of 0.05 and a power of 90%, we estimated that the calculated sample size would be 11, 16 and 19 patients for TSH, prolactin and cortisol levels, respectively. The study sample size was therefore set at 20 patients per group. The results of the pilot study were not included in the present data. Data in text and tables are presented as mean (standard deviation). Patient characteristics data were analysed with the *t*-test. Statistical analyses were undertaken using the multivariate analysis of variance for repeated measures and the Scheffé *post hoc* test.

The three groups were homogeneous with respect to age, body weight and duration of operation. Mean duration was 25 ± 7 min.

Changes of serum prolactin, TSH and cortisol levels in the three groups are shown in Table 1. For prolactin a statistically significant increase in Group GA was observed 6 min after anaesthesia induction, persisting throughout our whole observation period. A slight increase in prolactin was observed 10 min after induction, which peaked at the end of the operation, showing a very slight decrease 1 h post surgery. Similarly, TSH increased significantly in Group GA 4 min after anaesthesia induction. Nevertheless, TSH levels remained within the normal range until the end of the testing period in all groups. Cortisol levels increased significantly also in Group GA 10 min after anaesthesia induction and remained increased until the end of our observation period. However, cortisol changes remained within the normal range in all groups.

We have tested the hypothesis that anxiousness and pain may be the main reasons for hormonal response to cataract operation. Regarding anxiousness we compared local anaesthesia alone or under sedation with propofol concerning their effect on cortisol, TSH and prolactin serum levels. No statistically significant hormonal changes were observed between the two groups. On the other hand we tested the hypothesis that pain is the main reason for endocrine response; therefore, we compared local anaesthesia vs. TIVA with propofol concerning their effect on hormonal changes. Local anaesthesia prevented the hormonal response to cataract surgery while TIVA did not completely suppress the stress response, and therefore increased cortisol, prolactin and TSH levels were observed. With respect to cortisol, the results of our study partly agree with the previous studies, because although a statistically significant increase in cortisol during TIVA was observed, cortisol fluctuated within its normal range [1,2]. Since no concomitant opioids have been used in the present study, it is in support of the hypothesis that propofol is likely to have antinociceptive action. In addition, cortisol and TSH increase was within the normal range, while prolactin peaked at the end of the operation, showing a very slight decrease 1 h post surgery. Clinical significance for the observed hormonal response requires further investigation and confirmatory studies.

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Use of transoesophageal echocardiography in impending paradoxical embolism due to thrombus straddling a patent foramen ovale

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EDITOR:
Transoesophageal echocardiography (TOE) is now established as an important diagnostic tool in the operating theatre and the intensive care unit (ICU). The surgical management of pulmonary and intracardiac thromboembolism, particularly when complicated by impending paradoxical embolism, presents the perioperative echocardiographer with the opportunity to influence surgical decision making and to potentially improve patient outcome [1]. We report a case demonstrating the use of TOE in both the diagnosis and the intraoperative management of a patient with major pulmonary thromboembolism and thrombus straddling a patent foramen ovale (PFO).

A 47-yr-old female presented to hospital complaining of acute dyspnoea and palpitations. She had been less mobile in the previous 2 weeks because of

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