patients,\(^1\) \(^2\) and also the modest efficacy of currently available antiarrhythmic therapy, future trial of vernakalant for the treatment of new-onset AF in this group of patients seems warranted.

**Conflict of interest**

None declared.

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**Xenon anaesthesia for laparoscopic cholecystectomy in a patient with multiple chemical sensitivity**

Editor—The management of general anaesthesia in patients suffering from multiple chemical sensitivity (MCS) poses a challenge. MCS was described first in the 1940s.\(^1\) \(^2\) It occurs in response to diverse stimuli and emerges after exposure to usually harmless doses of environmental chemicals or medications. The pathophysiology of MCS is still only poorly understood. Hypotheses include triggers from unspecific allergic or toxic exposure and neurobiological sensitization.\(^3\) \(^4\) Therefore, patients are exposed to a significant risk of adverse drug interactions while undergoing general anaesthesia.\(^5\)

The noble gas xenon offers many characteristics of an ideal anaesthetic including haemodynamic stability and rapid induction and emergence from anaesthesia, regardless of its duration.\(^6\) \(^7\) Furthermore, as an inert gas, xenon is known to be independent of the patients’ metabolism and biotransformation, hence potentially interacting less with mechanisms possibly involved in the triggering of MCS. Therefore, we used xenon anaesthesia in a patient with MCS undergoing laparoscopic cholecystectomy.

A 53-yr-old female (1.68 m and 68.5 kg) presented with increasing pain due to chronic cholecystolithiasis and a persistent ovarian cyst, and was undergoing elective cholecystectomy and cyst enucleation. Since the early 1980s, the patient had suffered from MCS symptoms with high sensitivity to environmental chemicals, intermittent restlessness, and non-specific breathing problems. Since that time, the patient manifested multiple sensitivities to various drugs, which led to abstinence from all medication for >15 yr.

Preoperative evaluation classified the patient in the ASA II risk category and in a postoperative nausea and vomiting (PONV) risk score of III (Apfel score). The patient did not receive premedication. In the operating theatre, routine monitoring—consisting of three-lead-ECG, pulse oximetry, and intermittent arterial pressure measurements—was instituted according to our clinical standards. The patient received 100% oxygen for 3 min and subsequently a bolus of fentanyl 0.15 mg. Induction of anaesthesia was started with a dose of propofol 150 mg followed by a repeated bolus of 100 mg, while the use of neuromuscular blocking agent was avoided. After tracheal intubation, the lungs were ventilated with a closed-circuit anaesthetic machine (TAEMA Felix Dual\(^6\); ALMS, France) using volume control. After denitrogenation had been completed, xenon was started aiming at a target concentration of 54%. Two additional doses of fentanyl were given i.v., 0.1 mg before incision and 0.05 mg 45 min after start of surgery. During surgery, neither heart rate nor arterial pressures indicated anaphylaxis (Fig. 1). At end of surgery (185 min), the xenon was stopped. The patient opened her eyes 150 s after termination of xenon, and adequate reaction on verbal command and spontaneous breathing were observed 20 s later, resulting in tracheal extubation 3 min after stopping the xenon. The patient was transferred to the postanaesthesia care unit and discharged 2 h later to the surgical standard care unit. The patient did not have PONV and Aldrete score was >9 throughout the first 6 h after end of surgery. Likewise, postoperative visits on the first and second postoperative days did not show any adverse events or signs of intolerance and the patient’s recovery was appropriate. The patient was interviewed 14 days after discharge and complained of difficulties regarding full mobilization, which she attributed to the surgical procedure but did not exhibit any signs of chemical sensitivity or intolerance during the whole postoperative course.

At present, there is no gold standard for general anaesthesia in patients with MCS. The special characteristics of the noble gas xenon may offer a new approach for safe anaesthesia in patients with MCS.
Conflict of interest

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Fig 1 Ventilator settings during anaesthesia: inspiratory O2 fraction (FIO2), expiratory xenon concentration (FEXe), and overall xenon consumption (Xe consumption). Haemodynamic characteristics: heart rate (HR), systolic arterial pressure (SAP), diastolic arterial pressure (DAP).
Anaphylactic shock after sensitization to gelatin

Editor—Allergic reactions are a known complication of general anaesthesia. A previous safe anaesthetic does not guarantee that subsequent anaesthesia with the same drugs will remain uneventful. We report here a case of anaphylactic shock to gelatin given 60 days after a previous uneventful administration.

A 64-yr-old woman was admitted with a fracture of L2 after a fall and a dorsal stabilization of Th11 to L3 was performed. General anaesthesia was given using propofol, sevoflurane, fentanyl, remifentanil, and atracurium and the patient received crystalloid and gelatin without any complication. Her medical history included liver cirrhosis (Child A) and various allergies. Wound healing was delayed because of infection and negative pressure wound therapy was initiated. About 2 months after the initial operation, a secondary closure of the wound was planned and a general anaesthesia with propofol, fentanyl, and rocuronium was performed. Surgery was complicated by clinically relevant epidural bleeding and additionally to the volume substitution with crystalloids and infusion with gelatin was started. Shortly thereafter, the patient developed shock and the ECG showed ST-segment elevation. With a high degree of suspicion for an anaphylaxis, the infusion with gelatin was immediately stopped and therapy with oxygen, antibiotics, and various medications was started. Post-mortem serum analysis from frozen probes established a high IgE titre in the plasma (7.19 kU litre\(^{-1}\)) confirming the allergic background. From the clinical situation, the most likely diagnosis is IgE-mediated anaphylactic reaction to gelatin-based colloid.

During general anaesthesia, the incidence of anaphylaxis is in the range of 1 in 2000 to 1 in 20 000 anaesthetics.\(^7\)\(^8\) The most frequently responsible medications for anaphylaxis are the neuromuscular blocking agents (>60%) and latex (15%) followed by colloids, hypnotic, antibiotics, and opioids.\(^5\)\(^6\) The particularity of this case is the fact that the patient received the identical gelatin during the first operation about 60 days before the event without any reaction.

The most important complication of gelatin-based colloids is the possible allergic reaction.\(^2\) Gelatin-based substances are known to create a sensitization. Nakayama and colleagues\(^7\) observed that IgE antibodies to gelatin were detected in 93% of the patients with anaphylaxis during vaccination and that 98% of these patients had a previous vaccination with gelatin-containing vaccine. A cross-reaction between gelatin-containing vaccines and gelatin-based colloids is possible.\(^8\) The time necessary for a sensitization to occur is still not elucidated but a minimum of 10–15 days seems to be necessary for a major anaphylactic reaction.\(^9\)\(^10\) The severity of the reaction is not predictable.

This case emphasizes the need to be alert when administering colloids as their use can lead to severe and possibly fatal complications. The previous administration of the same substance does not guarantee that it will be safely tolerated again since sensitization can always occur. The rate and risk of sensitization to gelatin or other possible allergens is still not precisely known and should be further analysed.

Conflict of interest

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