However, the infant calmed down within 5 min and was brought to the operating room. There, standard monitoring (electrocardiography, pulse oximetry, and noninvasive blood pressure) was easily applied and a 24 G cannula inserted into a vein of the left hand. Oxygen was given for 3 min to a cooperative infant and a test dose of thiopental 12.5 mg given into a fast running solution of normal saline. Alfentanil 0.25 mg and thiopental 87.5 mg were administered i.v. for induction. Mask ventilation was easy and was performed for 1 min after which an LMA (size 2) was inserted without problems. Anesthesia was maintained with 2.7–3.4% sevoflurane in a mixture of 50% of oxygen/50% of air. Intermittent positive pressure ventilation was applied to maintain \( P_{\text{CO}_2} \) of 4.7–5.2 kPa (36–40 mmHg); analgesia was provided by intermittent application of alfentanil 0.14 mg. Immediately after beginning of anesthesia, the eyes were closed and stayed closed during surgery with standard adhesive tape covering the whole of the eyelids.

Surgery and anesthesia were uneventful and took 40 min. After removal of the surgical drapes and the tape from both eyes, a unilateral left-fixed mydriasis was noted (Figure 1). At this point, the endtidal sevoflurane concentration was 0.8%. Sevoflurane was stopped and 100% oxygen at 101 min\(^{-1} \) given. Spontaneous recovery of breathing occurred without clinical signs of excitation within 5 min, the infant woke up without any other neurological sign, the LMA was removed without problem. The infant was transferred to the postoperative recovery room, where a complete neurological examination was performed. There was no other neurological abnormality other than the unilateral mydriasis. The infant was kept in the PACU for 2 h until recovery of normal pupil size.

We present, as the most likely explanation, an accidental topical administration of atropine into the left eye after a solution of S-ketamine/atropine was administered into the left nostril for premedication. Possible mechanisms are: the infant coughed after the nasal administration of the liquid and wiped his nose in defensive reaction immediately after the nasal application of atropine. Another possible explanation is the retrograde migration of atropine via the nasolacrimal duct into the conjunctival sac, possibly enhanced by the mask ventilation prior to insertion of the LMA – increased pressure facilitating the migration.

As a new routine procedure adopted after this case, we check for pupil size and equality immediately before anesthesia, after induction and before commencement of surgery and at the end of surgery and document it on the anesthesia protocol sheet. We recommend this procedure in order to better determine the cause of this (rare) complication.

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**References**


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**Figure 1**

Check of pupil size immediately at the end of surgery under general anesthesia. Note the fixed, dilated pupil on the left side.

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Heart rate variability in a child with hereditary sensory autonomic neuropathy 2 (HSAN 2) during general anesthesia with propofol and fentanyl


**SIR**—Hereditary sensory autonomic neuropathy 2 (HSAN 2) is a rare, recessively inherited neuropathy, characterized by diffuse impairment of discriminative touch and pressure sensation (1,2). Although autonomic dysfunction associated with HSAN 3 (Riley–Day syndrome or familial dysautonomia) are well known (3), nothing is known about autonomic dysfunction in patients with HSAN 2 (1,4). Although there is no previous report about autonomic nervous dysfunction, the association with distal anhidrosis has been described (3). Thus, autonomic dysfunction may be dormant and become manifest on exposure to general
Table 1 Comparison of heart rate variability (HRV) parameters in conscious state between six healthy children and a patient with hereditary sensory autonomic neuropathy 2 (HSAN 2)

<table>
<thead>
<tr>
<th></th>
<th>Age</th>
<th>HR</th>
<th>Entropy</th>
<th>LF</th>
<th>HF</th>
<th>LF/HF</th>
</tr>
</thead>
<tbody>
<tr>
<td>Healthy children</td>
<td>8.7 ± 2.7</td>
<td>87 ± 8</td>
<td>69 ± 9</td>
<td>1599 ± 1248</td>
<td>955 ± 578</td>
<td>2.1 ± 1.7</td>
</tr>
<tr>
<td>A patient with HSAN 2</td>
<td>9</td>
<td>81</td>
<td>64</td>
<td>1188</td>
<td>514</td>
<td>2.5</td>
</tr>
</tbody>
</table>

HR, heart rate; LF, low frequency; HF, high frequency.

anesthesia. So, it is crucial to assess autonomic nervous function before anesthesia in a patient with HSAN.

Heart rate variability (HRV) is a well-established, noninvasive probe to assess autonomic nervous activity. Recently, the MemCalc method, which is a combination of the maximum entropy method for spectral analysis and the nonlinear least squares method for fitting analysis (Tarawa, Suwa Trust, Japan), has been developed (5,6) and this enables us to estimate reliable HRV from a series of R-R interval for 30 s.

Here, we report the autonomic nervous activity in a patient with HSAN 2 during the conscious state and under general anesthesia with propofol and fentanyl by examining HRV.

A 9-year-old girl (117 cm height, 23 kg weight) was scheduled to have plastic surgery for a wound scar in her left lower and upper extremities under general anesthesia. As she had insensitivity to pain, recurrent trauma, and mental retardation from birth, she had been diagnosed as HSAN 2, but had no history of hyperpyrexia or anhidrosis.

No premedication was given. Conventional monitoring of ECG, noninvasive blood pressure, pulse oximetry, and bispectral index (BIS) was initiated. ECG signal was obtained from an anesthesia monitor (Hewlett Packard; Model 66 S, Palo Alto, CA, USA), digitized at 1000 Hz, and transferred to a personal computer (Epson NT2700, Suwa, Japan). After the R-R intervals were determined, on-line analysis of HRV was made by the MemCalc method. Then the averaged heart rate, the entropy of 8 R-R intervals, the power of low (LF; 0.04–0.15 Hz) and high (HF; 0.15–0.4 Hz) frequency component of HRV and the ratio of LF to HF (LF/HF) were calculated during the entire course of anesthesia.

As shown in Table 1, HRV measurement before induction of anesthesia revealed that HRV parameters in the conscious state were comparable with those obtained from six healthy children (7–13 years). General anesthesia was induced with 6 mg·kg⁻¹ of propofol, 25 μg of fentanyl, and 2 mg of vecuronium. After tracheal intubation, she was mechanically ventilated with 50% oxygen in air.

In contrast with the previous report describing the high incidence of hemodynamic instability in patients with Riley–Day or congenital insensitivity to pain with anhydroses (CIPA) (4,7), heart rate and blood pressure were stable during the course of anesthesia, which was maintained with propofol (3–5 mg·kg⁻¹·h⁻¹) and fentanyl (total 200 μg over 4 h). Although no hemodynamic changes were observed on skin incision, heart rate transiently increased when she coughed. Rectal temperature was also monitored and no sign of hyperpyrexia developed. After the surgery and propofol were discontinued, she woke up and recovered uneventfully.

The trends of BIS and HRV parameters during anesthesia are shown in Figure 1. Anesthesia with propofol and fentanyl decreased BIS, heart rate, and LF but did not affect entropy and HF. As a result, LF/HF significantly decreased. We used propofol and fentanyl as general anesthetics to avoid untoward cardiovascular effect of inhalation anesthesia. Although it is controversial (8), propofol is known to induce a centrally mediated decrease in sympathetic tone and an increase in vagal tone, and it has been shown that fentanyl-diazepam-pancuronium anesthesia resulted in a decrease in LF/HF associated with bradycardia (10). Considering these previous reports, the response of HRV to propofol and fentanyl was thought to be quite normal. The results of HRV assessment revealed no subclinical signs of dysautonomia and anesthesia was uneventful. However, we cannot conclude that a patient with HSAN 2 is free from dysautonomia because of few symptoms, because cardiovascular collapse during anesthesia has been reported in patients with HSAN 3 or 4, (4,7). We propose that HRV measurement using the MemCalc method might be helpful for the evaluation of autonomic nervous activity in the anesthesia management of a patient with HSAN.

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Figure 1
Trends in bispectral index (BIS), heart rate (HR), blood pressure (BP), entropy, LF, HF, and LF/HF during anesthesia in a patient with hereditary sensory autonomic neuropathy 2 (HSAN 2). I, induction of anesthesia; T, tracheal intubation; E, extubation.
Nitinol mandril guide wire facilitates percutaneous subclavian vein cannulation in a very small preterm infant


Sir—Percutaneously placed central venous neck lines can be associated with potentially life-threatening complications (1,2). If the Seldinger technique is used the advancement of the guide-wire into the vein of small neonates can represent a major problem even after successful puncture of the vein. We describe the use of the Nitinol Mandril wire-guide (Cope Nitinol Mandril Wire Guide; William Cook Europe, Bjdeversk, Denmark) for subclavian vein cannulation in two very small preterm infants, weighing 820 and 850 g, respectively.

A premature female infant 24 weeks of gestation, birth weight 650 g was scheduled for patent ductus ligation plus external ventricular drainage 3 weeks after delivery.

On preoperative evaluation she was in a poor overall condition. She weighed 820 g and required high frequency oscillation with FIO₂ of 0.4 and a mean airway pressure of 13 mmHg with bronchopulmonary dysplasia as well as the patent ductus. She was on low-dose dopamine. Furthermore history revealed an intraventricular hemorrhage (IVH) Grade III, 2 days after birth and recurrent enteral feeding difficulties.

On admission to the operating theater, conventional pressure controlled ventilation (peak inspiratory pressure (PIP) 25 mmHg, positive-end expiratory pressure (PEEP) 5 mmHg, FIO₂ 0.4) was tried and was acceptable. Because of the extremely difficult peripheral vein status, the likely need for inotropic drug support and continuing enteral feeding problems it was decided to place a 2 Fr central venous line into the left subclavian vein. A rolled towel was placed under the shoulders, the head was left in the midline position without Trendelenburg position because of the history of IVH.

With light external pressure on the liver a 19 G butterfly needle (Epicutaneo-Cava-Katheter; Vygon, Aachen, Germany) was inserted infracavicularly, lateral to the midpoint of the clavicle under sterile conditions. The tip of the needle was carefully directed immediately under the clavicle aiming at a point 0.5 cm above the suprasternal notch.

Thereafter the needle was slowly withdrawn until blood trickled out of the needle. A 60-cm long guide wire with a diameter of 0.46 mm (Cope Nitinol Mandril Wire Guide; William Cook Europe) was advanced through the needle into the vein until supraventricular arrhythmias were noted on the electrocardiogram (ECG) (Figure 1). The needle was removed and a 4-cm long 2 Fr catheter (Seldiflex; Plas- timed, Saint-leu-la-Foret Cedex, France) was threaded over the guide wire with a standard Seldinger technique. Blood was successfully aspirated and a chest X-ray confirmed correct catheter placement and no detectable complications.

The twin brother of baby 1 presented for emergency laparotomy because of suspected necrotizing enterocolitis (NEC) with probable intestinal perforation 3 weeks after delivery. On the preoperative examination he appeared to be in very poor condition with a widely extending bluish abdominal wall. He weighed 850 g, was on conventional volume controlled pressure regulated ventilation (PIP 17 mmHg, PEEP 5 mmHg, FIO₂ 0.4) and had a patent ductus. In the operating room it was decided to place a central venous line into the left subclavian vein because of the poor peripheral vein status, the likely need for inotropic drugs, enteral feeding problems and expected major intraoperative blood losses as well as fluid shifts. Central venous cannulation was performed exactly in the

References


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