Paratubal cyst: A trigger for intra-operative vasovagal reflex

Sir,

The vasovagal reflex, a complex neurocardiogenic reflex, breaks down the autonomic control of heart rate and blood pressure affecting adequate systemic perfusion. The afferents for this reflex are carried by the general visceral afferents of the vagus nerve to the nucleus of the solitary tract, producing an efferent, phasic, abrupt and rapidly reversible parasympathetic response through the dorsal motor nucleus, which manifests as relative sinus bradycardia, sinus arrest or paroxysmal atrioventricular block. A manifold of intra-operative inputs may trigger the vasovagal reflex, including peritoneal stretch, surgical traction on visceral ligaments, manipulation of abdominal contents, bladder distension and even direct laryngoscopy.

A 31-year-old, 33 weeks-primigavida, presented with complaints of headache, blurring of vision and pedal oedema since the last 3 days. She was diagnosed with gestational hypertension and an emergency category II lower segment caesarean section was planned in view of the reversed end-diastolic flow in the umbilical artery. The pre-operative evaluation was essentially unremarkable and regional anaesthesia was planned using a sub-arachnoid block (SAB). Injection bupivacaine (heavy) 0.5% (Anawin Heavy, Neon), 2 ml was administered in the intrathecal space at L3-L4 intervertebral level using a 26G Quincke spinal needle in the sitting position. Loss of temperature sensation to alcohol swab was achieved up to T4 level within 10 min. Simultaneously, the patient was co-loaded with intravenous Ringer’s Lactate (total 900 ml) and her vital parameters remained stable. After 8 minutes of skin incision, the baby was delivered. Injection oxytocin 20IU was given in a slow infusion of normal saline. After the closure of the uterus, further exploration of the adnexa showed a 10 cm x 5 cm right paratubal cyst. As the operating team punctured the cyst in a guarded manner, the patient expressed sudden restlessness, nausea, light-headedness and pallor concomitant with sudden severe bradycardia. The electrocardiogram (ECG) showed a transient second-degree atrioventricular block followed by a complete heart block. The operating team was informed immediately and the procedure was stopped temporarily. Sinus rhythm returned on the ECG after prompt intravenous injection of atropine 0.6 mg followed by 20 ml normal saline. The level of blockade by SAB was reassessed after achieving haemodynamic stability and it was adequate. A cystectomy was performed and the rest of the surgical procedure was uneventful. The specimen was sent for histopathological co-relation and it was reported to be a paratubal cyst. The patient’s history was revisited and it revealed no previous vasovagal episodes (fainting spell).

A shift in the balance of the autonomic nervous system toward parasympathetic predominance intra-operatively may be precipitated by either surgical stimulation of visceral vagal afferents or initiated by the Bezold-Jarisch reflex (BJR). The temporal association of ECG changes with adnexal manipulation, in this case, suggests a directly elicited reflex by the surgical stimulation of general visceral afferents of the vagus nerve rather than an indirect one caused by the BJR. The patient was sufficiently hydrated before the onset of sudden severe bradycardia excluding the chances of hypovolaemia. Further, bradycardia resolved immediately after the interruption of surgical stimulation and/or prompt intravenous injection of an anticholinergic agent.
We reviewed the magnitude of the vagal supply to the female reproductive organs to explore the biological association of this rare presentation. Anatomic studies in rats indicate vagal innervation of the uterus and the ovary.\(^3\) Electrophysiologic evidence supporting the existence of a brain stem-uterus circuit is provided by animal studies that involve the vagus nerve.\(^4\) Welento et al.\(^5\) in a bovine study, showed that a small number of vagal nerve fibers are sent directly from the central nervous system to the uterus. Engel suggested the existence of vagal innervation of the human uterus and sex organs while reviewing some rare reflexes that are mediated by the vagus nerve.\(^6\) There is a description of severe bradycardia in surgical literature during the handling of the spermatic cord, and thereby proposing that the stimulation of embryologically equivalent structures may elicit similar rare reflex activity in both genders.\(^7\) Surgical manipulation of the paratubal cyst caused sudden severe cardiovascular depression in our case. We believe that an afferent impulse originating either from the ovary, uterus or the fallopian tube itself could have elicited efferent vagal over-activity in the cardiovascular system. We suggest that effective prophylactic measures to prevent this catastrophic event should be the areas of further research.

Declaration of patient consent
The authors certify that they have obtained all appropriate patient consent forms. In the form, the patient has given her consent for her images and other clinical information to be reported in the journal. The patient understands that her name and initials will not be published and due efforts will be made to conceal identity, but anonymity cannot be guaranteed.

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Conflicts of interest
There are no conflicts of interest.

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