

Parkinson's induced severe restrictive respiratory dysfunction for deep brain stimulation - Anaesthesiologists' perspective

Sir,

Deep brain stimulation (DBS) is an essential procedure for patients with Parkinson's disease (PD) to ameliorate the motor symptoms refractory to medical therapy. Pulmonary dysfunction is frequent in patients with PD that gains the anaesthesiologist's attention during the pre-operative visit. Restrictive respiratory dysfunction in PD has a prevalence ranging from 28% to 94%.^[1,2] We present the successful anaesthetic management of a patient with PD with a severe restrictive lung pattern who underwent the DBS procedure. The PD-induced restrictive lung should not be considered a contraindication for delaying the beneficence of the surgical procedure.

A 50-year-old male diagnosed with PD was posted for the DBS procedure under awake craniotomy. The patient had no smoking history or any history of chronic pulmonary disease. On clinical examination, extensive rigidity was noted all over the body including the chest wall (Tense pectoralis and abdominal muscles) with decreased chest wall movement on deep inspiration. The preoperative pulmonary function test (PFT) showed forced expiratory volume (FEV₁) and forced vital capacity (FVC) of 2.1 L and 2.3 L, respectively, with a normal ratio (93.8%) that was characteristic of a restrictive lung pattern [Figure 1a]. Preoperative chest X-ray (CXR) and computed tomographic scan of the chest were unremarkable [Figure 1b]. On the contrary, the arterial blood gas (ABG) analysis revealed hypoxaemia with a partial pressure of oxygen (PaO₂) of 55 mmHg and partial pressure of carbon dioxide (PaCO₂) of 35 mmHg. As the patient had normal lung parenchyma without musculoskeletal abnormalities in the imaging, a diagnosis of PD-induced early restrictive respiratory dysfunction was made considering the normal PaCO₂ level. Intravenous dexmedetomidine infusion was administered at 0.5 µg/kg/hour and a scalp block was performed with 15 ml of 0.5% bupivacaine in the operating room. Oxygenation was provided by trans-nasal humidified rapid insufflation ventilatory exchange (THRIVE)

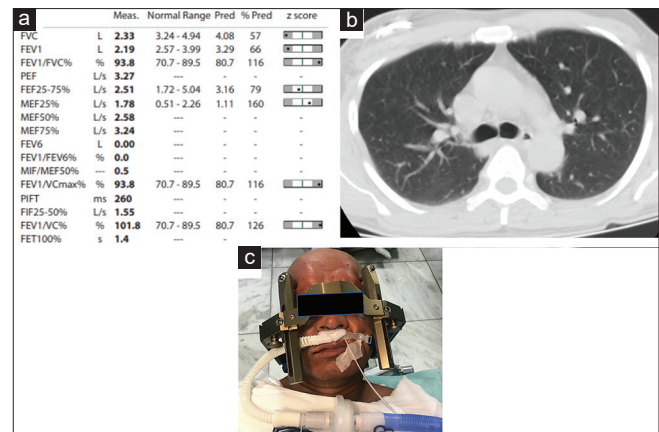


Figure 1: (a) Restrictive lung pattern in the preoperative pulmonary function test. (b) Preoperative computed tomographic scan depicting a normal lung parenchyma. (c) THRIVE oxygenation during awake craniotomy

through a custom-built nasal cannula at a flow rate of 30 L/min [Figure 1c]. Following the macro-stimulation testing and microelectrode recording, DBS electrodes were placed successfully. The patient was planned for DBS battery placement in the same setting under general anaesthesia. Following an uneventful course, the trachea was successfully extubated, and the patient was shifted to the recovery unit.

Restrictive respiratory dysfunction in PD has not been clearly defined. The possible aetiology includes asynchrony in respiratory muscle contraction, increased chest wall rigidity, and pleuropulmonary fibrosis induced by ergot-based dopamine agonists.^[1,3] The anaesthesiologist must rule out parenchymal and other musculoskeletal pathology with appropriate imaging to arrive at this diagnosis. PD-induced restrictive lung patterns usually present with hypoxaemia and hypercarbia due to hypoventilation. Our patient had hypoxaemia with a normal carbon-dioxide level that can be associated with the early stages of restrictive respiratory dysfunction. PD-induced restrictive respiratory dysfunction can be reversible as it correlates to the improvement in the motor symptoms over some time following the DBS procedure. It is a common tendency to delay the surgical process until the underlying respiratory condition improves considering the higher risk of perioperative complications. It is very much imperative for the anaesthesiologist not to deny the presurgical anaesthetic fitness solely based on the PFT report in PD-induced restrictive lung conditions. THRIVE oxygenation can improve patient safety during the conduct of awake craniotomies.^[4] In the intraoperative period, THRIVE can provide better

oxygenation in patients with PD-induced severe respiratory dysfunction undergoing awake surgery.

To conclude, PD-induced restrictive respiratory dysfunction is a reversible condition following the DBS procedure and it should not be the determining factor in delaying the surgical process from the anaesthesiologist's perspective.

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form, the patient(s) has/have given his/her consent for his/her images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

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Conflicts of interest

There are no conflicts of interest.

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