



Laparoscopic fundoplication for a child with abdominal intrathecal Baclofen pump

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(v) Running title: Fundoplication for a child with ITB Pump

(vi) An authorship declaration

The authors have no conflicts of interest to declare.

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Abstract

This is the first case report describes a laparoscopic fundoplication in a child with an intrathecal Baclofen pump which was inserted because of severe spasticity secondary to cerebral palsy. The child had symptoms of gastroesophageal reflux with recurrent episodes of aspiration pneumonia. These were managed with a gastrostomy and conservative therapy with no success. The presence of an intrathecal Baclofen pump makes abdominal surgery challenging and carries the risk of pump infection with its associated sequelae. We, however, performed a successful laparoscopic fundoplication with no intraoperative complications and the child was asymptomatic at 18-month follow-up.

Introduction

Baclofen was first synthesized in the 1960s as a γ -aminobutyric acid (GABA) agonist to treat epilepsy and ITB therapy has increasingly been used in the treatment of spasticity and dystonia in children with cerebral palsy and other neurological conditions¹. Although patients who are candidates for ITB therapy may have GER because of their spasticity and dystonia, there are few reports discussing treatment strategies for GER in children with ITB pumps²; additionally, there are no reports on fundoplication in children with ITB pumps.

We describe the first case of a successful laparoscopic fundoplication (LF) in a child with abdominal intrathecal Baclofen (ITB) pump.

Case Presentation

A female infant was born at 26 weeks of gestation, with a birth weight of 936 g. She

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developed severe cerebral palsy due to hyperbilirubinemia. To relieve the resultant, long-term, severe spasticity, when the child was 9 years old, a 3-inch wide (in diameter) intrathecal baclofen (ITB) pump (SynchroMed II, Medtronic Inc, USA) was implanted in her left abdominal wall. Nevertheless, the patient experienced repeated episodes of vomiting and developed aspiration pneumonia, secondary to persistent gastroesophageal reflux (GER) disorder. At 10 years of age, the patient underwent gastrostomy because her treating surgeon, at the time, believed that the presence of the ITB pump in situ would make the fundoplication procedure technically challenging and may also lead to contamination and infection of the pump. However, the severity of GER continued to increase, leading to repeated episodes of aspiration pneumonia. At the age of 14 years, the patient was referred to our hospital for further management. Since her GER was not controlled and as she had not responded to conservative management, we decided to perform fundoplication to relieve her symptoms.

Preoperatively, we checked the position and routing of the implanted ITB pump and its catheter radiographically and using three-dimensional (3D)-computed tomography (CT) (Fig. 1a,b). According to both the findings of these imaging studies and the record of the procedure, the catheter had been inserted into the medullary space at the level of the 7th thoracic vertebra and had been passed through subcutaneous tissues of the lateral abdomen to join the ITB pump, which had been implanted under the fascia of the external oblique muscle. To prevent injury and disallow direct contamination of the ITB pump and catheter, we planned to make our incision at >3-cm distance from the site of placement of the pump and catheter. As the ITB pump occupied the left side of the abdominal wall and the gastrostomy had been created just caudal to the xiphoid process (Fig. 1), we had limited abdominal space to perform the procedure. Therefore, we

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selected the laparoscopic approach for fundoplication (Fig. 1c).

Antibiotic prophylaxis with intravenous cefazolin was initiated 30 min prior to surgical incision and continued for 24 h. Considering that temporary removal or exchange of the ITB pump could be required, due to conversion to an open procedure, or in case of obvious contamination of the ITB pump, a pump supplier and a neurosurgeon were kept on stand-by to perform the replacement procedure.

Under general anesthesia, the patient was placed in the supine position. Five trocars were inserted (Fig. 1c), and laparoscopic fundoplication (LF) was successfully performed without any intraoperative complication, such as obvious contamination of the ITB pump and catheter.

Enteral feeding was initiated on the 1st postoperative day, and the patient was discharged on the 14th postoperative day. The patient remained asymptomatic at 18 months after the surgery.

All data were collected anonymously, and the patient's mother provided written and informed consent for the use of medical information and images in this case report. The Ethics Committee of our institution waived the requirement of ethical approval for the publication of this case report.

Discussion

Our case highlighted two important clinical issues related to implementation of ITB therapy in children. Firstly, the placement of the ITB pump may influence the decision to perform fundoplication by making the procedure technically challenging. As the size of the ITB pump may be large for a child, the site of implantation and the routing of the catheter should be carefully considered, bearing in mind the possibility of requirement

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of future abdominal surgeries.

Secondly, all efforts should be made to prevent postoperative infection while performing abdominal procedures in a child with an ITB pump in-situ, as any infection may lead to a critical complication like meningitis. Previous studies on ITB pump complications in children report a relatively high incidence of infection at $\leq 10\%$ ¹⁻³.

Some investigators have tried to reduce the rate of occurrence of ITB pump-related infections through perioperative care of the implantation site⁴. If a patient with an ITB pump in situ requires abdominal surgery, the pediatric surgeon should take care to prevent surgery-related infection. Spader et al. reported that a gastrostomy is not a risk factor for ITB pump infection, indicating that the presence of a gastric stoma by itself would not lead to an infection of the surgical site². However, we believe that all efforts should be taken to prevent contamination of wounds perioperatively during any abdominal operation performed subsequent to an abdominal ITB pump implantation.

To the best of our knowledge, this is the first case report describing a successful fundoplication procedure in a child with an abdominal ITB pump in situ. Prospective reporting of similar cases is required to validate the feasibility of LF in children with implanted abdominal ITB pumps.

Author contribution:

Y.B., H.M, Y.A, T.N, Y.T, and Y.O. managed the patient and contributed to conception of the manuscript; Y.O. drafted the manuscript; and Y.B. and Y.O. reviewed the manuscript.

All authors approved the final manuscript as submitted and agree to be accountable for all aspects of the work.

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Figure Legend**Figure.**

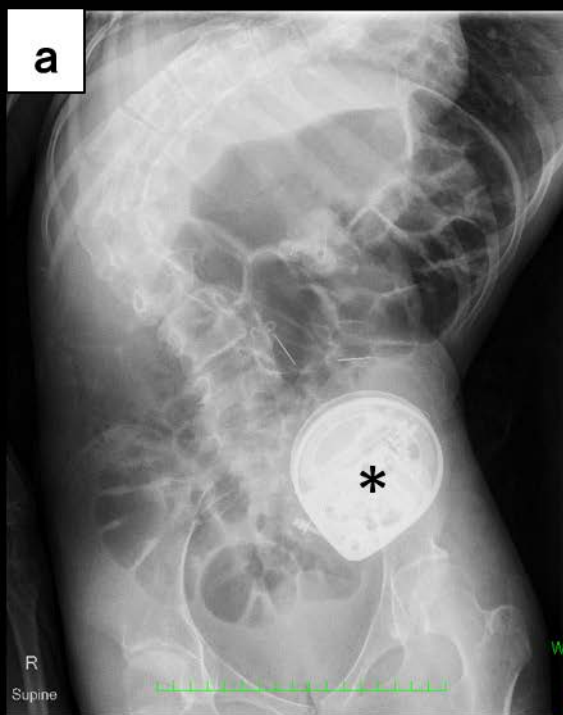
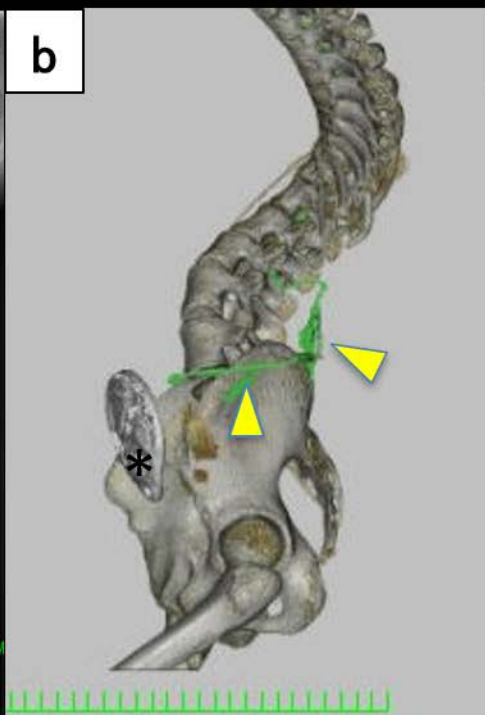
- (a) Preoperative plain abdominal radiography. Asterisk is ITB pump.
- (b) Preoperative 3D computed tomography. Arrow heads are ITB pump catheter and asterisk is ITB pump.
- (c) Scheme of Placements of ports of Laparoscopic fundoplication. A transumbilical camera port (5 mm), two working ports (5 mm), one liver retractor port (5 mm) and one assistant's port (5 mm).

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