



タイトル Title	Laparoscopic fundoplication for a child with abdominal intrathecal Baclofen pump
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掲載誌・巻号・ページ Citation	Asian Journal of Endoscopic Surgery,13(3):441-443
刊行日 Issue date	2020-07
資源タイプ Resource Type	Journal Article / 学術雑誌論文
版区分 Resource Version	author
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DOI	10.1111/ases.12752
JaLCDOI	
URL	http://www.lib.kobe-u.ac.jp/handle_kernel/90007444

Case report

1 **Title page**

2 (i) Case report

3 (ii) Laparoscopic fundoplication for a child with abdominal Intrathecal Baclofen Pump

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

9 (vi) An authorship declaration

10 The authors have no conflicts of interest to declare.

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18 Word count: 990 words (1200 words), 5 reference, and 3 figures.

19 **Keywords:** gastroesophageal reflux, fundoplication, intrathecal baclofen pump

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1 **Abstract**

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

11

12 **Introduction**

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

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

22

23 **Case Presentation**

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

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

14 Preoperatively, we checked the position and routing of the implanted ITB pump and its
15 catheter radiographically and using three-dimensional (3D)-computed tomography (CT)
16 (Fig. 1a,b). According to both the findings of these imaging studies and the record of
17 the procedure, the catheter had been inserted into the medullary space at the level of the
18 7th thoracic vertebra and had been passed through subcutaneous tissues of the lateral
19 abdomen to join the ITB pump, which had been implanted under the fascia of the
20 external oblique muscle. To prevent injury and disallow direct contamination of the ITB
21 pump and catheter, we planned to make our incision at >3-cm distance from the site of
22 placement of the pump and catheter. As the ITB pump occupied the left side of the
23 abdominal wall and the gastrostomy had been created just caudal to the xiphoid process
24 (Fig. 1), we had limited abdominal space to perform the procedure. Therefore, we

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

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

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

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

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

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Discussion

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

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1 of future abdominal surgeries.

2 Secondly, all efforts should be made to prevent postoperative infection while
3 performing abdominal procedures in a child with an ITB pump in-situ, as any infection
4 may lead to a critical complication like meningitis. Previous studies on ITB pump
5 complications in children report a relatively high incidence of infection at $\leq 10\%$ ¹⁻³.
6 Some investigators have tried to reduce the rate of occurrence of ITB pump-related
7 infections through perioperative care of the implantation site⁴. If a patient with an ITB
8 pump in situ requires abdominal surgery, the pediatric surgeon should take care to
9 prevent surgery-related infection. Spader et al. reported that a gastrostomy is not a risk
10 factor for ITB pump infection, indicating that the presence of a gastric stoma by itself
11 would not lead to an infection of the surgical site². However, we believe that all efforts
12 should be taken to prevent contamination of wounds perioperatively during any
13 abdominal operation performed subsequent to an abdominal ITB pump implantation.

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

18

19 **Author contribution:**

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

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

1

2 Acknowledgements:

3 We would like to thank Editage (www.editage.jp) for English language editing; and to
4 thank Yumiko Tachibanaki, Yumiko Nakai, Yudai Tsuruno and Ayano Uematsu for their
5 support in managing patient and in reviewing this manuscript.

6

7 **Disclosure:** Authors declare no conflict of interests

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Figure Legend**10 Figure.**

11 (a) Preoperative plain abdominal radiography. Asterisk is ITB pump.

12 (b) Preoperative 3D computed tomography. Arrow heads are ITB pump catheter and
13 asterisk is ITB pump.

14 (c) Scheme of Placements of ports of Laparoscopic fundoplication. A transumbilical
15 camera port (5 mm), two working ports (5 mm), one liver retractor port (5 mm) and one
16 assistant's port (5 mm).

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