



Video-assisted thoracoscopic surgery for a pediatric patient with descending necrotizing mediastinitis

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Descending necrotizing mediastinitis (DNM) is a life-threatening infectious disease of the mediastinum, with a high mortality rate of 16.5–50% (1-3). DNM is normally caused by deep neck infection (DNI); therefore, computed tomography (CT) is essential for confirming abscess formation in both the mediastinum and deep neck. Recently, Gehrke *et al.* reported 45 (20.6%) patients with DNM among 218 patients with DNI, indicating that approximately 20% of DNI cases develop into DNM (4). Furthermore, the researchers found that, out of the 218 total patients, 5 (2.29%) patients with DNM required surgical treatment. Therefore, it is important for physicians to check for the presence of DNM along with DNI.

DNI is relatively uncommon in children, but has potentially fatal complications. However, a significant number of children with DNI are successfully treated with antibiotic therapy alone. Therefore, debate regarding the role of surgical treatments in the treatment of DNI exists. In 2021, Lipssett *et al.* reported the results of a retrospective cohort study using the Pediatric Health Information System database, which included data from children aged 0–12 years who were hospitalized with a diagnosis of DNI, between 2010 and 2018 (5). A total of 9,766 children were enrolled in the study, and 6,861 patients were finally included in the analyses. The researchers found that the proportion of children who had been surgically managed had decreased from 42.0% (in 2010) to 33.5% (in 2018). Initial surgical

management was performed for 1,853 (27.0%) children with DNI, and initial medical management was performed for 5,008 (73.0%) children with DNI. Among the 5,008 children, 897 (17.9%) children experienced failure of medical treatment, and required some type of surgical procedure as a result. As mentioned in the discussion of the paper, surgical incision and drainage were historically considered the gold standards of treatment; however, these methods carry the risks of anesthesia- and neurovascular-related injury. Despite this, the occurrence of surgical management has decreased over time.

Zhang *et al.* reported a case of a 6-year-old girl who presented with odynophagia, dental pain in the right upper molars, and a high fever of 40 °C (6). Her symptoms worsened despite administration of broad-spectrum antibiotics; therefore, urgent CT was performed, where DNI with DNM were diagnosed. Although empiric administration of antibiotics was initiated, the patient experienced rapid tachycardia and dyspnea. Emergent thoracentesis of the left pleural effusion was performed to drain 80 mL of profuse brown sticky pus, which had proven to be that of a left empyema. Pus culture detected *Streptococcus constellatus*, and blood culture was negative. Since further CT imaging demonstrated exacerbation of DNI, DNM, and empyema, physicians decided to perform emergency surgery—including surgical debridement of the mediastinum and pleura (with complete excision),

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and decortication of necrotic tissue. Video-assisted thoracoscopic surgery (VATS) was performed in patients without cervicotomy or transcervical drainage, and two chest drains were positioned in the left thoracic cavity. After surgical treatment, the patient recovered daily and was discharged without complications.

The case of the 6-year-old girl was a very rare case of DNM complicated by severe empyema in childhood. Furthermore, surgical treatment was successfully achieved, using VATS for left thoracic and mediastinal drainage. Unlike VATS in adults, single-lung ventilation in children is very difficult, due to the narrow and short airways of children. Therefore, a device is required to secure the airway and obtain optimal visualization of the whole pleural cavity. Using two-lung ventilation by a cuffed endotracheal tube (5 mm in size), the patient was placed in a right lateral decubitus position. In addition, the researchers required positive intrathoracic pressure management to ensure a good operative field. Currently, the role of VATS in children with DNM is unclear, since only a few cases (eight, including this case) involving VATS in children have been reported (7). Although it is necessary to consider anesthesia management and a good operative field, physicians considering VATS as an option for radical therapy in both adult and child patients is worthwhile.

In general, fluid collections in the deep cervical fascia must be drained immediately; however, the researchers in this study decided to avoid transcervical drainage (because the size of the cervical abscess was in fact decreasing—a finding based on further CT imaging). The principles of DNI with DNM treatment must be remembered, as deep cervical and paratracheal drainage via a transcervical approach effectively controls all types of DNM (8). This case is unique in that the patient recovered without both cervicotomy and transcervical drainage, thus making this case both exceptional and atypical.

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