



## Case Report

# Successful Surgical Treatment of Stage IVB Immature Teratoma Involving the Liver and Thoracic Cavity, With Combination Chemotherapy: A Case Report

Eun-Kyu Park<sup>1</sup>, Sang Hwa Song<sup>2</sup>, Yang Seok Koh<sup>2</sup>

<sup>1</sup>*Department of General Surgery, Chonnam National University Hwasun Hospital, South Korea*

<sup>2</sup>*Chonnam National University Hwasun Hospital, Hwasun-gun, Jeollanam-do, Korea*

**Introduction:** Immature teratomas are very rare tumors, representing only 1% of ovarian cancers. Distant metastases to the liver effect late disease manifestation, rendering chemotherapy the only viable option.

**Case presentation:** Here, we report the successful surgical management of stage IVB immature teratoma after cisplatin-based chemotherapy. A 20-year-old woman presented with a huge abdominal palpable mass and dyspnea. Postoperative pathology confirmed immature teratoma with metastases to the liver, diaphragm, and thoracic cavity (stage IVB). The patient underwent right hemihepatectomy, diaphragm resection, thoracic mass resection, and diaphragm repair using aortic artificial graft. She did not receive postoperative adjuvant chemotherapy. After the complete surgical resection of the tumor, the patient had no recurrence during the 44-month follow-up period.

**Conclusion:** No established treatment modalities have been developed for further treatment, once the first-line combination chemotherapy achieves unfavorable results in stage IVB immature teratoma. Surgical resection may offer hope for excellent disease control in this dismal stage. To obtain best possible outcomes, coordinated care between oncologists and general surgeons is required.

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Corresponding author: Yang Seok Koh, Chonnam National University Hwasun Hospital 322 Seoyang-ro, Hwasun-eup, Hwasun-gun, Jeollanam-do, Korea 58128. Tel.: +82-61-379-7650; E-mail: yskoh@jnu.ac.kr

Immature teratomas are very rare tumors, representing 1% of all teratomas, 1% of all ovarian cancers, and 35.6% of malignant ovarian germ cell tumors.<sup>1,2</sup>

When computed tomography (CT) and magnetic resonance imaging (MRI) evaluations indicate immature teratoma, exploratory laparotomy with cytologic washings, peritoneal biopsies, and omental assessment are performed to stage these patients.<sup>3</sup> Unilateral salpingo-oophorectomy is the current standard of care for early-stage immature teratoma. However, for stage IVB tumor, which distantly metastasizes to the liver and lung, effective treatment is not well established. Chemotherapy is the only viable option.<sup>4</sup>

We present a very rare case of stage IVB immature teratoma surgically resected completely after 4 cycles of bleomycin, etoposide, and cisplatin (BEP) chemotherapy.

### Case Report

A 20-year-old-woman consulted our hospital for surgical resection of a huge hepatic mass extending into the entire thoracic cavity. She had cachexia and dyspnea because of the compression effect of the mass on the heart and the lungs. A year ago, she was diagnosed with stage IVB immature teratoma after right salpingo-oophorectomy and liver biopsy for liver mass, which was regarded as unresectable at another tertiary center. Thereafter, 4 cycles of BEP chemotherapy were initiated at the Chonnam National University Hwasun Hospital, South Korea. Though the level of alpha-fetoprotein was decreased from 11.9 IU/mL to 6.5 IU/mL, the size of the mass slightly increased. CT (Fig. 1a) revealed a mass measuring 20 × 19 cm, which occupied the right liver and the majority of the thoracic cavity, shifting the mediastinum and heart to the left corner of the thorax. Without oxygen support, she could barely walk, and she was intermittently admitted to the intensive care unit for ventilator support. The only recourse for her was surgical resection because of chemoresistance of the tumor and her bed-ridden state. Discussion between oncologists and hepatic and thoracic surgeons led to the decision that surgical resection was the best treatment option.

She underwent right hemihepatectomy, diaphragm resection, thoracic mass resection, and diaphragm repair using aortic artificial graft. The operation lasted 14 hours with a blood loss of 2,000 mL. Eleven packs of packed red cells were

transfused during the operation. She was given 2 days of intensive care unit care and was discharged on postoperative day 24, uneventfully. Pathologic examination of the tumor revealed extensive necrosis, multiple microcalcification, and focal immature component probably due to chemotherapeutic effect; a final diagnosis of grade I immature teratoma (Fig. 1d and 1e) was made. She was followed-up for 3 months during which time she underwent abdominal and chest CT (Fig. 1b). Until 44 months after the surgery, she had no recurrence.

### Discussion

Despite the rarity of immature teratoma, its incidence as an ovarian tumor is not uncommon. It occurs most frequently during the first 2 decades of life in women. The most common symptoms are abdominal distension and masses. Prognosis depends on the grade and stage of the tumor.<sup>5</sup>

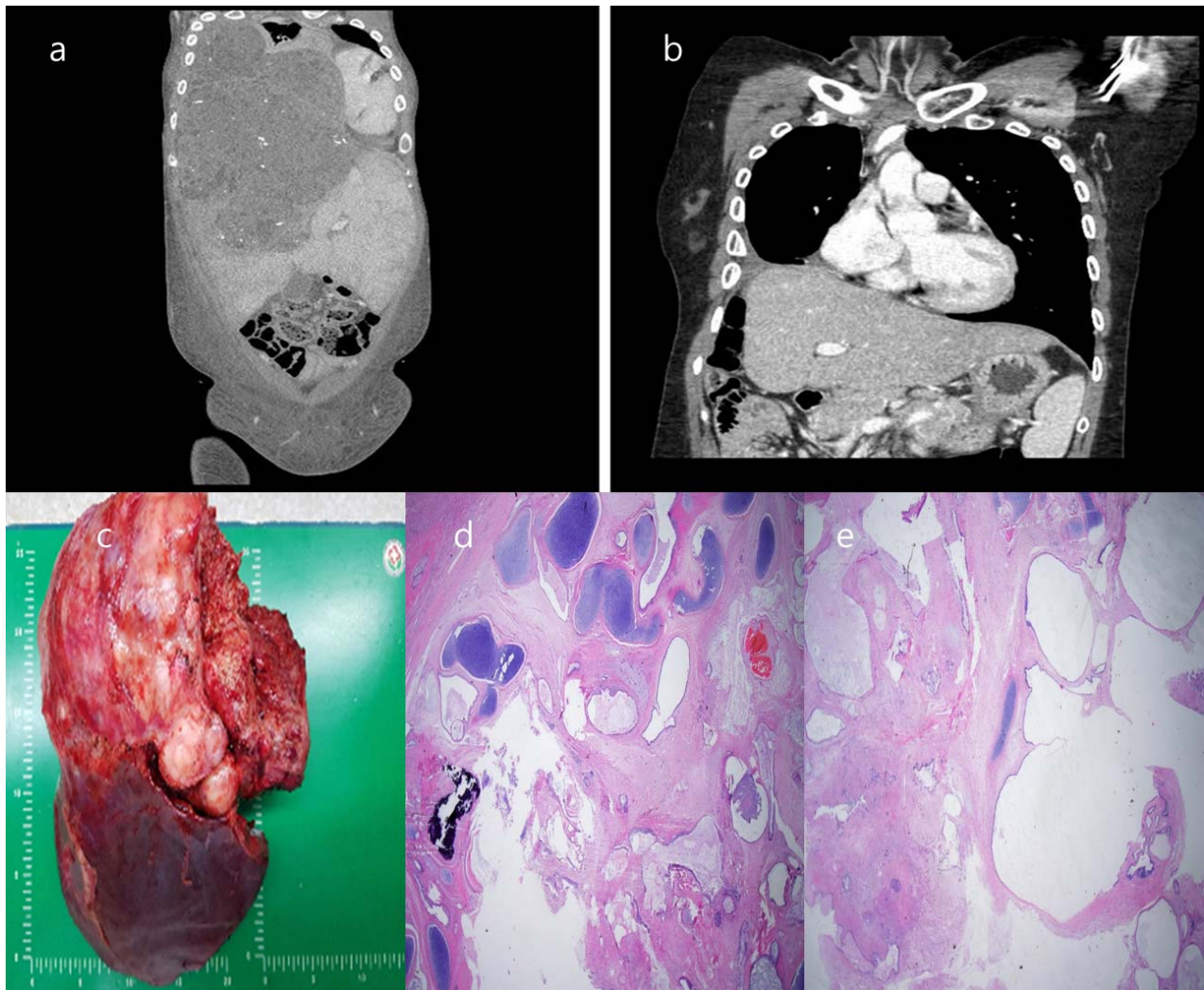
Stage I immature teratomas comprise the majority of cases and have good prognosis with overall 5-year survival rate of 98%. Surgical resection is the standard of care in the early stage.

Combination chemotherapy<sup>6</sup> with BEP is administered as adjuvant chemotherapy after primary surgery for grade II and III tumors as a standard of care.

In advanced stages of immature teratomas, no standard therapeutic modality has been established and only empirical treatments are considered according to center policy. In most cases, a multidisciplinary approach combining chemotherapy and surgical resection may achieve improved survival.

In this patient, she had a huge metastatic chemoresistant tumor involving the liver and most of the thoracic cavity. Hepatic and thoracic surgeon cooperation made it possible to resect the tumor completely. This case highlights the importance of the multidisciplinary approach for the further advanced stage of immature teratomas.

Despite diverse measures to achieve better survival, advanced stages of stage IVB tumors have poor prognosis. Inability to completely resect tumors renders surgeons palliating the tumors; debulking surgery can be attempted and perioperative combination chemotherapy can be adopted. Only when complete surgical resection is success-



**Fig. 1** (a) Coronal section of abdominal MRI showing an immature teratoma tumor measuring 20 × 19 cm on the right lung and mediastinum. (b) Coronal section of chest CT (20 months after surgical resection) showing no recurrent mass or remnant lesions. (c) The resected tumor. (d) Tumor is composed of a mature cartilage, intestinal epithelium, liver, and brain tissue with microcalcification, and focal necrotic change (H&E stain, 10×). (e) Immature neuroepithelium is identified in focal area of the tumor (H&E stain, 100×).

fully performed can the best prognosis be anticipated.

## Conclusion

Stage IVB immature teratoma are a very advanced stage of the cancer; chemotherapy alone is insufficient. A multidisciplinary approach adopting surgical resection after combination therapy for stage IVB immature teratoma can improve survival.

## Patient's consent

Written informed consent was obtained from the patient to include images in the article

## References

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