A Rare Case of Fetal Adenocarcinoma of the Lung

Nonso C. Osakwe, MD, MPH, Jiankun Tong, MD, William H. Rodgers, MD, PhD, Amanda L. Kansler, MPH, Paul C. Lee, MD, and Subroto Paul, MD

Departments of Cardiothoracic Surgery and Pathology, New York Hospital Queens, New York Presbyterian Hospital System, New York, New York

Fetal adenocarcinoma is a rare lung malignancy associated with improved outcomes compared to more common adenocarcinoma variants. We describe a case of a 31-year-old woman who presented with right-sided chest pain, and was subsequently diagnosed with an intermediate-grade stage IV fetal adenocarcinoma with chest wall invasion. She was treated with surgical resection and adjuvant radiation.


The term fetal lung adenocarcinoma was first introduced by Kodama and associates [1] in 1984. Fetal lung adenocarcinoma is extremely rare and represents approximately 0.1% of all primary lung neoplasms [2–5]. Fetal adenocarcinomas were previously classified as pulmonary blastomas. They were reclassified by the World Health Organization in 1999 as one of the rare four variants of invasive adenocarcinoma [2–5]. Fetal adenocarcinomas are typically well-differentiated low grade tumors that lack sarcomatoid elements. We present a case of fetal adenocarcinoma in a 31-year-old woman and review its clinicopathologic features.

A 31-year-old woman with history of hepatitis B and smoking presented with right-sided chest pain. On computed tomography (CT) and magnetic resonance imaging (MRI) scans, a 2.0 cm right upper lobe mass and a 4.0 cm pleural-based mass (Fig 1A) with chest wall invasion at right ribs 6, 7, and 8 and extension into the laminar body (Fig 1B) was discovered. A CT-guided biopsy of the pleural mass was found to be consistent with blastocytoma. A combined procedure with neurosurgery was performed with laminectomy of T6 and T7 through a posterior approach. Subsequently through a thoracotomy, an en bloc resection of the involved ribs and pleura was performed with a wedge resection of the right upper lobe lesion. The patient tolerated the procedure well and made an uneventful postoperative recovery.

Pathology analysis of the right lung showed a tumor consisting of tubular to cribriform glands with endometrioid morphology in a loose fibrous stroma with bland cytologic features and scattered morules (Fig 1C). The glands consisted of a mildly pleomorphic population of columnar cells with basally located nuclei with occasional nuclear clearing and numerous mitotic figures; scattered apical cytoplasmic vacuoles were also seen. Immunohistochemistry analysis of the resection specimen showed tumor cells positive for AE1/AE3, thyroid transcription factor-1 (Fig 1E), Cam 5.2 (Fig 1F), CD99 (patchy), vimentin (focal), Pax-8 (focal), and epithelial membrane antigen (focal). The placental alkaline phosphatase and B-cell lymphoma 2 immunostains were negative. Immunohistochemistry analysis performed for beta-catenin showed diffuse membranous and nuclear staining of the morules and diffuse membranous with focal nuclear staining of the glands. The chest wall tumor had similar cellular morphology to the lung tumor, but exhibited more of a solid and infiltrative growth pattern with soft tissue and bone involvement (Fig 1D). Fluorescence in-situ hybridization for SYT translocation was negative for a rearrangement involving SS18 (SYT) in both right lung mass and pleural-based mass, ruling out a synovial sarcoma as a diagnosis. The morphology along with immunohistochemistry and molecular studies supported a pathologic diagnosis of an intermediate-grade stage IV fetal adenocarcinoma with a positive margin at the spine.

Comment

We present the first case of intermediate-grade fetal adenocarcinoma of the lung in an adult. Although the term fetal adenocarcinoma was described in 1984, the first case of well-differentiated fetal adenocarcinoma was described 7 years later by Koss and associates [3]. Fetal adenocarcinoma is generally found in young patients with an age peak in the third decade, with a slight female predominance [2–5]. The tumors are usually localized and treated by surgical resection and sometimes chemotherapy and radiation [5, 6]. In addition to conventional lung adenocarcinoma, the differential diagnosis of these lesions also includes carcinoid tumors, more primitive embryonal malignancies and endometrioma, synovial sarcoma, and metastatic endometrial and colorectal adenocarcinoma [6]. Immunohistochemistry showed beta-catenin positivity, which is a distinct morphologic diagnostic marker of well-differentiated fetal adenocarcinoma. Our case is classified as an intermediate-grade fetal adenocarcinoma because it had features of both low-grade (formation of morules, lack of marked cellular pleomorphism, nuclear and membranous beta-catenin positivity) and intermediate-grade (focal solid and infiltrative growth pattern with desmoplastic reaction) tumors. Cases of intermediate-grade fetal adenocarcinoma have rarely been reported in the literature. The clinical nature of this type of fetal adenocarcinoma is largely unknown and comes from other case reports. Ironically, while they are histologically generally well-differentiated and localized, our case of...
intermediate-grade tumor had spread to the chest wall [5].

Patients with fetal adenocarcinomas have a better survival rate compared with similarly staged and treated adenocarcinoma of the lung [4]; they also have a 10-year survival of approximately 75% compared with 15% for pulmonary blastoma [7]. Adjuvant chemotherapy and radiation are unlikely to provide substantial benefit and are not recommended [8]. In select advanced cases, weekly doxitaxel with concurrent radiation (55 Gy) has been associated with a favorable response [5]. The benefit is still unclear, and no treatment guideline has been outlined. Our patient is currently receiving adjuvant radiation to her spine for her positive margin. In summary, we present the first case of intermediate-grade fetal adenocarcinoma of the lung in an adult.

References