

Pulmonary Artery Pseudoaneurysm: An Uncommon Complication of Primary Lung Neoplasms

Papke Carey*

Department of Oncology, University of Saskatchewan, Regina, Canada

Corresponding author: Papke Carey, Department of Oncology, University of Saskatchewan, Regina, Canada, E-mail: Carey_P@gmail.com

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Description

Pulmonary Artery Pseudoaneurysms (PAPs) are rare yet potentially life-threatening occurrences. We present the case of a male patient initially diagnosed with squamous cell lung carcinoma, presenting with hemoptysis. Despite no persistent bleeding observed during bronchoscopy, imaging revealed a pulmonary artery pseudoaneurysm, a cavitory lesion engaging with the bronchus and a tumor in the left lower lobe. Successful embolization of the pulmonary artery's originating segmental branch was performed. The etiology of PAPs associated with primary lung cancers remains uncertain. Our proposed mechanism involves a sequence of events: Initial tumor growth, vascular wall injury, inflammatory reaction, central cavitory necrosis, direct invasion into the artery, pseudoaneurysm formation and subsequent filling of the pre-existing cavitory lesion. This case underscores the importance of considering PAPs in the diagnosis of primary lung cancers, particularly in male patients with squamous cell pathology.

Pulmonary artery pseudoaneurysm

Pseudoaneurysms, abbreviated as PAs, represent localized dilations within arteries that lack the normal containment by arterial wall layers. Typically, they exhibit irregular shapes and tend to occur in vessels located beyond the circle of Willis. Formation of a pseudoaneurysm occurs when a blood vessel experiences complete disruption leading to hemorrhage. This results in the formation of a paravascular hematoma which subsequently develops a communication channel with the parent vessel wall. Consequently, the pseudoaneurysm wall is primarily composed of organized clot. Pseudoaneurysms are comparatively less prevalent compared to both saccular and fusiform aneurysms. Abdominal aortic pseudoaneurysms commonly arise as a consequence of iatrogenic procedures or blunt abdominal trauma.

Unlike true aneurysms, pseudoaneurysms lack all three layers of the vascular wall, relying solely on the adventitia for containment, thus posing a significant risk of rupture. They can emerge as a delayed complication of prior abdominal trauma, with iatrogenic sources encompassing procedures such as aortic

or spinal surgery. Detection of an aneurysm proximate to an anastomotic site or an area of spinal instrumentation may serve as a diagnostic indicator for pseudoaneurysm. Pulmonary Artery Pseudoaneurysms (PAPs) represent a rare yet potentially life-threatening vascular anomaly characterized by an abnormal localized bulging of the pulmonary artery. Unlike genuine aneurysms, PAPs exclusively impact the outer layers of the artery wall, rendering them susceptible to rupture owing to the reduced resistance of adjacent tissues. Among the most prevalent and concerning manifestations of PAPs is the occurrence of massive and life-threatening hemoptysis. Effectively managing PAPs poses a significant challenge, often necessitating a collaborative approach involving surgical intervention, endovascular procedures, or pharmacological treatments.

Paraneoplastic syndromes

Lung tumors frequently trigger the secretion of body-altering hormones, leading to the manifestation of unusual symptoms known as paraneoplastic syndromes. These syndromes are characterized by the inappropriate release of hormones, resulting in significant fluctuations in the levels of blood minerals. One of the most prevalent manifestations is hypercalcemia, marked by elevated levels of calcium in the bloodstream, often stemming from the excessive production of parathyroid hormone-related protein or parathyroid hormone. Hemoptysis is frequently associated with acute infectious bronchitis, often diagnosed based on compatible clinical or bronchoscopic findings. It's a commonly reached conclusion in many medical studies. While acute bronchitis can indeed lead to hemoptysis, the symptoms, signs and bronchoscopic observations associated with it lack sensitivity and specificity.

Research has shown that the diagnosis of acute bronchitis is often reached in patients who actually have another source of bleeding. Therefore, acute bronchitis should be viewed as a diagnosis of exclusion and thorough investigation is necessary to identify other potential causes of hemoptysis. Hemoptysis indicates potential bronchopulmonary issues, necessitating inclusion of fiberoptic bronchoscopy in the management plan, with the timing contingent on the severity of bleeding. A CT scan

serves as an initial, valuable and minimally invasive diagnostic tool. Bronchoscopy should be reserved for later stages of evaluation. Additionally, during bronchial or trans-bronchial lung biopsies, there's a risk of inducing hemoptysis. Hence, the operator and their team must maintain preparedness and composure to manage such occurrences calmly. Panic-induced increases in patient blood pressure could exacerbate bleeding and must be avoided.