AMERICAN JOURNAL OF RESPIRATORY AND CRITICAL CARE MEDICINE VOL 185 2012

Potentially Fatal Arrhythmia Complicating Endobronchial Epinephrine for Control of Iatrogenic Bleeding

Steinfort DP, Herth FJ, Eberhardt R, Irving LB.

Am J Respir Crit Care Med. 2012;185(9):1028-1030.

To the Editor:

The commonest reported complication of transbronchial lung biopsy (TBLB) is bleeding (1). Severe bleeding is seen in less than 1% of patients undergoing TBLB (2, 3). For such patients, irrigation of the airway/bronchus with refrigerated saline has been recommended (4, 5); however, many authors emphasize the use of endobronchial epinephrine 1:10,000 to control severe bleeding complicating TBLB (4, 6, 7).

Our institutions recently experienced two life-threatening complications following use of endobronchial epinephrine, both occurring in patients without any risk factors for fatal arrhythmia. We present these cases and review the literature regarding the clinical outcomes of bleeding complicating transbronchial lung biopsy.

CASE 1

A 55-year-old female with a lung nodule (Figure 1) underwent radial probe endobronchial ultrasound (EBUS) bronchoscopy. EBUS located the lesion and five TBLBs were performed via the guide sheath (GS) under fluoroscopic vision. Significant bleeding was noted and was unable to be controlled with bronchoscopic suctioning. Epinephrine (5 ml, 1:20,000) was instilled to the bleeding site via the guide sheath. Within 5 seconds, a narrow QRS complex tachycardia developed, and over 15 seconds, the ECG deteriorated into ventricular fibrillation (VF). Sinus rhythm was restored within 3 minutes by cardioversion (150 J). ECG subsequently demonstrated no abnormalities. Electrolytes were all normal. Histopathology of TBLB specimens demonstrated non–small cell carcinoma. Preoperative echocardiogram was normal and subsequent lobectomy was uneventful.

CASE 2

A 32-year-old male was investigated for a persistent parenchymal lung abnormality. The peripheral lesion was detected by radial probe EBUS, and through the GS, three TBLBs were

performed. Severe bleeding began immediately after the third biopsy. The GS was kept in situ to achieve tamponade of the bleeding; however, bleeding persisted. After 2 minutes, epinephrine (5 ml, 1:20,000) was instilled via the guide sheath. Within seconds, VF developed. Restoration of sinus rhythm was achieved by direct cardioversion (250 J). Electrolytes were all normal. Left heart catheterization demonstrated normal findings. Histology examination demonstrated cryptogenic organizing pneumonia.

DISCUSSION

Based on the temporal relationship between instillation of epinephrine and onset of arrhythmia, as well as the absence of any other identified precipitant, VF in both patients is assumed to have been the consequence of injection of epinephrine via the guide sheath into the lung periphery. Epinephrine dose precipitating VF in our patients (0.25 mg) is consistent with previous reports describing coronary vasospasm and myocardial infarction following intravenous epinephrine doses as low as 0.1 mg (8). One report describes the advent of ST-segment elevation following endobronchial administration of just 3 ml epinephrine 1:10,000 (0.15 mg) (9), and sub-mucosal doses as small as 0.036 mg have been reported to cause coronary vasospasm and myocardial infarction (10). Previous authors have opined “There does not appear to be a maximal dose of epinephrine which can be safely administered” (6); however, published literature, and our experience, indicate that this is untrue. In contrast, the contribution to hemostasis made by epinephrine in patients with severe bleeding following TBLB is unknown. Furthermore, review of the literature suggests that aggressive control of iatrogenic bleeding is unnecessary. Death following bronchoscopy is very rare (1, 11, 12), and is generally the consequence of respiratory or cardiac compromise (1, 11, 12). Fatalities due to bleeding complicating TBLB are exceedingly rare—we note just one published report (13). Large studies prospectively examining outcomes following TBLB in a combined 10,000 patients (including 82 patients with massive hemoptysis) noted no patients with bleeding requiring surgical or blood product management (1, 12), suggesting that even severe bleeding may not result in adverse outcomes.

Significant bleeding complicating EBUS–TBLB via GS is even rarer than for standard TBLB, presumably to the tamponading effect of the GS at the site of bleeding. Both institutions had only recently independently commenced the practice of instillation of epinephrine via the GS. Less than 10 patients had received epinephrine in this fashion. While it is therefore difficult to comment on the likelihood of such a complication following instillation of epinephrine into the lung periphery via the GS, the severity of the complication described in our two patients is beyond doubt.

In summary, we suggest that epinephrine should never be ad-ministered into the lung periphery via the guide sheath. We advise caution with endobronchial use of epinephrine given the uncertain contribution of epinephrine to control of bleeding following TBLB, the extremely low risk of major adverse outcomes of iatrogenic bleeding, and the potential for fatal cardiac sequelae of endobronchially administered epinephrine. It may be that failure to control bleeding using iced saline and bronchoscopic tamponade should simply be managed by ongoing iced saline and bronchoscopic tamponade.

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