Congenital bronchial atresia (CBA) is a rare congenital abnormality of the lung. It results from congenital focal obliteration of a proximal segmental or sub-segmental bronchus with normal development of distal structures. Because of proximal bronchial stenosis, the distal bronchi became filled with mucus and form a bronchocele. Three dimensional (3D) volume rendering (VR) imaging was performed with 64-slice multidetector computed tomography (MDCT) equipment in a patient with CBA and bronchocele. 3D VR images clearly revealed branching nonenhancing tubular structure and the adjacent lung with features of air trapping. A diagnosis of bronchocele was made radiologically. We report a case of bronchocele documented by 3D image reconstruction and VR images using 64-slice MDCT. In this article we report that, the radiologic findings of the bronchocele can be shown more clearly with 3D VR technique than standart CT imaging.

Key Words: Lung; bronchi; tomography, spiral computed
development in CT imaging that has direct implications in the three dimensional (3D) imaging of various systems. This technique allows a precise evaluation of the vascular, bronchial when and parenchymal structures especially, additional volume rendering (VR) images are obtained. In this case report, we presented the findings of 3D MDCT and VR images in of a patient with bronchocele. We report, to our knowledge, the first case of bronchocele documented by 3D image reconstruction and VR imaging with 64-slice MDCT, in this article.

CASE REPORT
A 29-year-old man complained of chest pain and cough. Laboratory data included a white blood cell count of 8800/mm^3. Electrocardiogram was normal. A chest radiograph obtained in inspiration showed a shadow of a mass in the right lower lobe. Contrast enhanced 3D MDCT was performed with a 64-slice scanner (Siemens Sensation 64, Erlangen, Germany). One hundred milliliters of iodinated contrast medium (100 ml of Ultravist, Germany) was injected at a rate of 4 ml/s, and after a delay of 15 s, a multislice acquisition was obtained from the aortic arch to the pulmonary basis with a scan time of 12 s, a slice thickness of 1 mm, and 1 mm intervals between slices. The volume rendering (VR) and maximum intensity projection (MIP) techniques were used. The MIP and 3D VR images clearly revealed branching nonenhancing tubular structure and the adjacent lung with features of air trapping seen as an area of hypertranslucency around the affected bronchi in the right lower lung (Figure 1,2). A diagnosis of bronchocele was made radiologically. At thoracotomy, the case showed subsegmental bronchial atresia with regional bronchocele and the focal hyperinflation with air trapping as compared with normally ventilated adjacent regions. Pathological diagnosis was made by findings of the resected specimen with distal mucus-filled bronchocele surrounded by hyperinflated lung parenchyma.

DISCUSSION
The bronchocele (bronchial mucocele) is develops gradual accumulation of mucus in the distal portion of obstructed bronchial tree. The causes of the occlusion may be congenital structural defect of the

FIGURE 1: Pulmonary CT MIP images. A: Mediastinal window of axial MIP image showed a branching nonenhancing tubular structure (arrows) in the lower lob of the right lung. B: Pulmonary window of sagittal MIP image revealed a tubular structure and the adjacent lung with features of air trapping (arrows) in the lower lob of the right lung.
bronchus, cicatrical shrinkage of the bronchial lumen, neoplasm and so on. While the lobar bronchial atresia causes invariably atelectasis, segmental or subsegmental bronchial atresia may not cause any change in volume of the involved lung segment or subsegment. Most of the bronchoceles due to bronchial atresia show a striking degree of focal hyperinflation in the involved area because of the presence of collateral ventilation and check valve mechanism of the involved airways. Most patients are asymptomatic at the time of diagnosis. However, they can present with dyspnea, pneumonia and bronchial asthma.

Bronchial atresia is the second most common congenital malformation of the tracheo-bronchial tree. The left upper lobe is involved in 64% of cases, the left lower lobe in 14% and the right middle and lower lobes in 8% of cases. It usually involves a single lung segment although multiple lung segment involvement has been reported.
Our patient had a bronchocoele located in the rarest site, the right lower lobe.

CT is a very sensitive method for demonstrating the typical features of bronchocoele and CBA. The pathognomonic feature is that of branching nonenhancing tubular structure representing the bronchocoele. This is characteristically surrounded by hyperinflation, representing air trapping. Our case demonstrated both of these features in the MIP and 3D VR images. With use of contrast, CT scanning has been reported to rule out a vascular abnormality, making angiography unnecessary, and virtual CT bronchography has also been used for the evaluation of congenital tracheobronchial lesions. In our case, contrast enhanced 3D MDCT images helped to distinguish the bronchocoele from intrapulmonary vascular structures (Figure 1). In this case, the MIP and 3D VR images successfully depicted the bronchocoele as a branching nonenhancing tubular structure and the adjacent lung with features of air trapping was seen as an area of hyperinflation around the affected bronchi. This is the pathognomonic finding of CBA and should suggest the diagnosis of bronchocoele.

MDCT, new imaging technique, has a high acquisition speed and probably more importantly, it acquires volume data instead of individual slice data. These two factors, together with thin section slices, enable a new technique to provide almost isotropic data that can be arranged in different planes without compromising the spatial resolution of the original axial images. The MDCT makes it possible to examine the entire lung with thin slices during optimal enhancement in a single breath hold, allowing better depiction of the pulmonary vascular and bronchial tree. MDCT 3D reconstruction and VR images of the lung may give the thoracic surgeon a clear-cut idea of the segment involved and how to plan the surgical approach.

The 3D MDCT imaging is a rapidly evolving technique in the imaging of the pulmonary system. The main disadvantage of MDCT is the limited access to suitable MDCT technology. In this case, the 3D MDCT and VR techniques allowed a complete evaluation of the bronchocoele. The result of this case suggests that pulmonary 3D image reconstruction and VR images using 64-slice MDCT in the bronchocoele are feasible and can depict the bronchocoele in encouraging detail.

In conclusion, this case report indicates that pulmonary 3D reconstruction and VR techniques with 64-slice MDCT are fast and accurate techniques for delineation of the bronchocoele. The bronchocoele as a branching nonenhancing tubular structure and the adjacent lung with features of air trapping seen as an area of hyperinflation around the affected bronchi can be visualized clearly with 3D image reconstruction and VR imaging using 64-slice MDCT.

REFERENCES


