An Inspirational All-Around Survey on Ground Glass Opacities

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Short Communication

In the last decade, with the advent of computed tomography screening for lung cancer, the number of Ground-Glass Opacity (GGO) nodules detected and referred for diagnosis and management has been increased. In particular their incidence has been reported with a range from 6% to 12% of all pulmonary nodules founded in usual Computed Tomography (CT) screening programs [1]. Indeed, GGO is a radiologic definition indicating a “lesions showing hazy increased attenuation without obliteration of the underlying bronchial or vascular structures on high-resolution CT” [2].

Unfortunately, a mere GGO finding is not “per se” diagnostic, in fact “GGO” is a rather unspecific radiologic feature common in several clinical conditions ranging from benign to malignant pathologic diseases.

For instance, lung infections, lung edema or interstitial diseases may present with GGO features. But often GGOs are also expression of primary lung cancer, therefore correct and early diagnosis and management are mandatory, since 75% of persistent GGO nodules are attributable to adenocarcinoma [3].

It has been showed that lung adenocarcinoma carcinogenesis follows a straight-line multistep progression and Atypical Adenomatous Hyperplasia (AAH) evolves into Adenocarcinoma in Situ (AIS), which in turn become invasive adenocarcinoma [4]. GGOs, in case of malignancy, correlates with different histologic patterns usually in accordance with specified radiologic features. First of all, it has been showed that risk of malignancy is significantly increased for GGOs with a larger diameter, high mean CT value and maximum CT value [5]. More specifically, distinction between pure and partial GGOs, and the ratio between solid and non solid components are a main issues when evaluating the oncologic outcomes of these radiologic findings [6,7]. Matsunaga and colleagues have brilliantly described this topic [8], showing that part-solid tumors can be categorized by invasiveness and prognosis, based on a cutoff consolidation-to-tumor ratio of 0.5 (consolidation-to-tumor ratio less than 0.5 equivalent to non solid-predominant part solid lesion; consolidation-to-tumor ratio greater than 0.5 equivalent to solid-predominant lesion).

In the last decade several papers have been published on GGOs radiologic features, methods for diagnosis and surgical treatment. However, to this day, many surgeons find it difficult to manage patients with these asymptomatic and occasionally detected nodules [9]. In our opinion the possible main causes of this lack of confidence, as opposed to solid nodules, may be summarized as follows:

1. GGOs clinical behavior is generally indolent [10]; Fukui in 2017 [11] presented a retrospective study to state differences in the pathological invasiveness between GGO with and without changes over time and found that the pathological results of part-solid GGO with changes were similar to those without changes. Moreover, also results of pure GGOs with changes were corresponding to those of part-solid GGO. They concluded that surgery can be deferred until part-solid GGO lesions demonstrate changes and, even for pure GGO, follow up is mandatory.

2. Their preoperative diagnosis is quite difficult, as even fluorine-18 fluorodeoxyglucose positron emission tomography (FDG-PET) often fails to distinguish benign from malignant GGO nodules [12]; moreover, its role in tumor is staging is dubious or even useless as showed by Cho et al. in their study on 164 patients who underwent surgical resection for adenocarcinoma with pure GGO features.

3. It is technically challenging to perform both Endobronchial Ultrasonography (EBUS) and percutaneous biopsy because nodule size is usually small and specimen obtained is often not proper for diagnosis, especially in pure GGOs. However, when EBUS is combined with Virtual...


