The management of lung cancer is undergoing significant transition toward more personalized therapy that takes into account the histological features and molecular markers of the tumor in addition to clinical features such as smoking history, performance status and comorbidities. The 2012 Saudi Lung Cancer Guidelines incorporated emerging recommendations that have strong evidence and impact patient outcome. In this manuscript, we will highlight the major updates from the prior guidelines.

Initial patient’s assessment

The initial patient assessment is critical to determine and document 3 major variables, in addition to obtaining good history and perform physical examination. These variables are performance status (PS), smoking history and comorbidities.

1. **Performance status**: Historically, performance status is one of the most reliable prognostic factors in lung cancer. It dictated the management of the patients for many years. Patients with poor PS status were usually excluded from clinical trials and therefore, many of the patients with poor PS were not offered any cancer therapy especially systemic therapy. With the development of targeted therapy with favorable therapeutic index, many of these patients now have an option for treatment which was further enhanced by determining molecular markers that predicts benefit from this therapy and therefore, minimizing futile treatment.

2. **Smoking history**: Including previous and current smoking history due to its impact on patients outcome and its value in enriching selection of patients for further molecular studies as non-smoking patients is likely to have EGFR mutation compared to smokers. Furthermore, continuation of smoking will negatively impact and may interfere with some of the treatment agents and decrease its efficacy such as Tyrosine Kinase Inhibitors (TKIs).
Therefore, counseling current smokers about smoking cessation is important in providing better patient care.

3. Comorbidities: Knowing concurrent chronic or acute medical conditions is critical during patients’ evaluation as some conditions will play a major role in selecting therapeutic interventions for both local (surgery or radiation) or systemic intervention.

For example, having serious lung or heart diseases may eliminate surgery from the treatment menu even for early stage lung cancer or at least prevent the performance of optimal cancer surgery. Furthermore, certain acute infectious disease such as hepatitis or tuberculosis may raise concerns about immunosuppressant chemotherapy at least prior to an induction phase of infection therapy. The availability of targeted therapy that does not cause bone marrow suppression provides an excellent practical option for these patients.

Initial diagnosis and work-up

This is the most critical item related to treatment decision based on the tumor characteristics which is the second component of personalized therapy (the first one being patient’s characteristics).

Obtaining adequate tumor sample

This is often a limiting step in the proper diagnosis and work-up of lung cancer patients with common habit of obtaining the least possible diagnostic specimen such as cytology from bronchial tree or pleural effusion or small biopsy specimen by different approaches.

This approach once accepted as standard of care, is no longer appropriate for the management of NSCLC for the following reasons:

1. The need to have adequate tissue to determine the histological subtype of NSCLC as this determination will have major implication on treatment selection as follows:
   a. The documented benefit of certain treatment options is limited to histological subtypes such as pemetrexed and bevacizumab in non squamous cell lung cancer.
   b. The increased risk of complications such as hemorrhage in squamous cell lung cancer with bevacizumab.
   c. The decision of doing further testing such as EGFR mutation is generally recommended to non squamous cell lung cancer histology.

2. Having adequate tissue is necessary to do further testing besides immunohistology (IHC) such as molecular studies for EGFR mutation or EML4-ALK fusion tests.

Determining EGFR mutation status is an important factor in the decision about proper utilization of these agents in the management of lung cancer especially the first line therapy.

These reasons highlight the importance of proper management of lung cancer specimen to make sure the specimen is utilized properly to have the best yield.

Staging

The staging work-up by imaging studies was organized in a way that is more practical to avoid doing tests that do not impact patient management. For example, the use of PET—CT Scan was limited to clinical scenarios where curative treatment is indicated to eliminate futile treatment of metastatic disease. PET Scan should not be done when it does not have an added value such as in definite metastatic setting.

This is a practical approach due to the shortage of PET—CT Scans in our regions. If PET is not available, then a bone scan should be done for stages IB—IV.

Disease management

Management of stages I—III

There was no modification of the treatment of stages I—III as no new practice changing evidence emerged recently except the impact of the new staging system. For example, malignant pleural effusion became stage IVA and not IIIB.

Management of stage IV

The management of stage IV evolved drastically over the last couple of years. The major changes were due to incorporation of EGFR mutation testing and EML4-ALK fusion into the practice and the emphasis on clarifying the histological subtypes which has practical implication as mentioned earlier.

The treatment decision is based on multiple factors that are summarized as following:

1. Determining curable conditions: such as single brain or adrenal lesion to provide potentially curable treatment.
2. Addressing scenarios that require a special attention upfront such as brain lesion and metastatic bone disease.
3. Determining EGFR mutation status to initiate TKI as early as possible whether as first line (strongly recommended) or switch maintenance or second line. The most important message here is that patients with EGFR mutation should get TKIs irrespective of setting or performance status. Also determining ALK fusion is important to utilize crizotinib as early as possible.
4. Selecting chemotherapy regimen based on histological subtypes favoring pemetrexed (over Gemcitabine) and bevacizumab combinations for non-squamous histological subtypes docetaxel/paclitaxel combination remains acceptable option.
5. Performance status of the patient is an important determinant of the treatment selection. Generally, patients with poor performance status 3—4 are not candidate for therapy. However, patient with EGFR mutation may be an exception to the rule due to the potential clinical benefits and reasonably safe toxicity profile.

Follow-up and surveillance

The required tests were clarified based on the clinical situation and treatment rendered conforming to the most common practice and recommendations.

In summary, 2012 Saudi Lung Cancer Guidelines incorporated many recent advances in the field as personalizing the management of lung cancer becomes more feasible due to major advances in the laboratory field as well as drug development. The manuscripts in this supplement give further details about these issue.

Funding

No funding sources.

Competing interests

None declared.

Ethical approval

Not required.

Appendix A. Lung Cancer Guidelines Committee members

Dr. Abdul Rahman Jazieh, King Saud bin Abdulaziz University for Health Sciences, Riyadh, KSA.
Dr. Abdulrahman Al Hadab, King Saud bin Abdulaziz University for Health Sciences, Riyadh, KSA.
Dr. Adnan Hebshi, King Faisal Specialist Hospital & Research Center, Riyadh, KSA.
Dr. Ahmed Abdulwarith, King Fahad Specialist Hospital, Dammam, KSA.
Dr. Ahmed Bamousa, Riyadh Military Hospital, Riyadh, KSA.
Dr. Ahmed Saaddeddin, Riyadh Military Hospital, Riyadh, KSA.
Dr. Ashwaq Al Olayan, King Saud bin Abdulaziz University for Health Sciences, Riyadh, KSA.
Dr. Azzam Khankan, King Saud bin Abdulaziz University for Health Sciences, KSA.
Dr. Foad Al Dayel, King Faisal Specialist Hospital & Research Center, Riyadh, KSA.
Dr. Hamed Al Husaini, King Faisal Specialist Hospital & Research Center, Riyadh, KSA.
Dr. Hamdan Al Jahdali, King Saud bin Abdulaziz University for Health Sciences, Riyadh, KSA.
Dr. Hana Bamefleh, King Saud bin Abdulaziz University for Health Sciences, Riyadh, KSA.
Dr. Khalid Al Kattan, Al Faisal University, Riyadh, KSA.
Dr. Loutfi, Shukri, King Saud bin Abdulaziz University for Health Sciences, Riyadh, KSA.
Dr. M. Hasan Rajab, Al Faisal University, Riyadh, KSA.
Dr. Sara Al Ghanim, King Saud bin Abdulaziz University for Health Sciences, Riyadh, KSA.
Dr. Turki Al Fayae, King Abdulaziz Medical City, Princess Noorah Oncology Center, Jeddah, KSA.
Dr. Yasir Bahadur, King Faisal Specialist Hospital & Research Center, Jeddah, KSA.