Screening for Mesothelioma

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Disclosures

None
What is screening?

*Testing for a disease before developing symptoms*

National Health Service, United Kingdom
Principles of screening

1. Characteristics of the disease
2. Suitability of a screening test
3. Effectiveness of early treatment

Adapted from Dubrow et al. CMAJ. 2018;190:E422-9
Principles of screening

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Characteristics of the disease

Malignant mesothelioma is a good candidate for screening

• Target population is well defined
• Associated with high morbidity and mortality
• Motivated patient population

*Exposure and risk may be challenging to quantify*
Principles of screening

1. Characteristics of the disease
2. *Suitability of a screening test*
3. Effectiveness of early treatment

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Suitability of a screening test

- Imaging
- Biomarkers
Suitability of a screening test

• Imaging
• Biomarkers
Suitability of a screening test

Imaging

Chest X-ray

Asbestos-exposed nuclear weapons workers, United States. (n=2,760)

<table>
<thead>
<tr>
<th></th>
<th>Interstitial Lung Disease, %</th>
<th>Pleural Thickening, %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Positive predictive value</td>
<td>66.7</td>
<td>74.0</td>
</tr>
<tr>
<td>Negative predictive value</td>
<td>97.6</td>
<td>91.8</td>
</tr>
<tr>
<td>Sensitivity</td>
<td>13.2</td>
<td>19.7</td>
</tr>
<tr>
<td>Specificity</td>
<td>99.8</td>
<td>99.2</td>
</tr>
<tr>
<td>False positive</td>
<td>0.2</td>
<td>0.7</td>
</tr>
<tr>
<td>False negative</td>
<td>2.4</td>
<td>8.0</td>
</tr>
</tbody>
</table>

Performance characteristics of chest X-ray compared with CT for detection of ILD and pleural thickening in 2760 nuclear weapons workers

Suitability of a screening test

Imaging

CT scan

Asbestos-exposed construction workers from Helsinki, Finland. (n=602)

Suitability of a screening test

Imaging

CT scan

Asbestos-exposed shipyard workers from Monfalcone, Italy. (n=1,045)

Suitability of a screening test

Imaging

**PET/CT scan**

- Good discrimination between benign and malignant disease
- Risk of missing very early disease
- No studies evaluating its role in screening
- Cost, limited access and lack of resources for interpretation likely preclude widespread use
Suitability of a screening test

• Radiographic testing

• Biomarkers
Suitability of a screening test

Biomarkers

Soluble mesothelin-related peptides
Soluble mesothelin-related peptides

Suitability of a screening test

- Soluble mesothelin-receptor protein
- Megakaryocyte pontentiating factor
- Osteopontin (OPN)
- Fibulin-3
- High-mobility group B1
- microRNAs
- Multiplex protein signatures
Principles of screening

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Effectiveness of early treatment
Survival for all patients undergoing any type of surgical procedure by stage

Survival for all patients undergoing any type of surgical procedure by histology

Efficacy of treatment

- Stage at presentation impacts survival only for epithelioid subtype
- Survival mostly impacted by histologic type
Conclusions

• Patients with asbestos exposure at risk for malignant mesothelioma are an appropriate cohort for targeted screening
• Lack of a good screening test that is sensitivity enough to pick up early cancers and specific enough to prevent unnecessary invasive testing
• Benefit of aggressive early treatment across a broad cohort of patients is unclear

The promise of better diagnostic tests and management strategies could make screening an important part of future care
Thank you