Leptomeningeal Metastases

This practice algorithm has been specifically developed for MD Anderson using a multidisciplinary approach and taking into consideration circumstances particular to MD Anderson, including the following: MD Anderson’s specific patient population; MD Anderson’s services and structure; and MD Anderson’s clinical information. Moreover, this algorithm is not intended to replace the independent medical or professional judgment of physicians or other health care providers. This algorithm should not be used to treat pregnant women.

Note: Consider Clinical Trials as treatment options for eligible patients.

WORKUP

- Physical exam with comprehensive neurologic evaluation
- Brain and spine MRI
- Cerebrospinal fluid (CSF) exam for the following:
  - Cell count with differential, with pathologist review as applicable
  - Glucose
  - Protein
  - Cytopathology (10-12 mL)
  - Flow cytometry for lymphoma or hematologic malignancies
- If indicated, consider:
  - Gram stain and culture
  - Cryptococcal antigen
  - Calcofluor white smear
  - Viral PCR (HSV, CMV, EBV)
  - Fungal and viral cultures
- Lifestyle risk assessment

DIAGNOSIS

- CSF positive for tumor cells
- Positive radiologic findings with supportive neurologic findings
- Suggestive CSF findings with supportive neurologic findings in a patient with a known malignancy

RISK STATUS

Poor Risk:
- Low Karnofsky performance status (KPS)
- Multiple, serious, major neurologic deficits
- Extensive systemic disease with few treatment options
- Encephalopathy

Good Risk:
- High Karnofsky performance status (KPS)
- No major neurologic deficits
- Minimal systemic disease
- Reasonable treatment options available for systemic disease (if applicable)
- Involved field radiation therapy to symptomatic sites and/or
- Best supportive care

TREATMENT

Consider:
- Fractionated external beam radiation therapy to symptomatic sites and/or
- Best supportive care

Consider placing intraventricular catheter (Ommaya Reservoir) and/or
- Consider ventriculoperitoneal shunt with on/off valve for intrathecal chemotherapy if symptoms and/or radiological findings suggestive of hydrocephalus

Conduct CSF flow scan, see Page 2

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1Mental status, cranial nerves, motor, sensory and cerebellar exam
2Use caution for lumbar punctures in patients who are anticoagulated, thrombocytopenic, or who have a bulky intra-cranial mass
3See Physical Activity, Nutrition, and Tobacco Cessation Algorithms; ongoing reassessment of lifestyle risks should be a part of routine clinical practice
4CSF suggestive of leptomeningeal metastasis in the absence of positive cytology includes high WBC and/or low glucose and/or high protein. If CSF is not positive for tumor cells, up to 3 lumbar punctures may be of clinical value.
5Poor risk patients with exceptionally chemosensitive tumors (e.g., small cell lung cancer, lymphoma) may be treated
6Refer Karnofsky Performance Status Scale (Appendix A) – Score of 50 or lower is considered a poor risk factor
7Refer Karnofsky Performance Status Scale (Appendix A) – Score of 60 or higher is considered a good risk factor
8Usually whole brain radiation therapy (WBRT) and/or partial spine field recommended

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Department of Clinical Effectiveness V4

Approved by the Executive Committee of the Medical Staff on 09/26/2017
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**PRIMARY TREATMENT**

- Induction intra-CSF chemotherapy\(^1\) for 4-8 weeks, if systemic disease stable
  - or - Consider high-dose methotrexate (if breast or lymphoma)
  - or - Consider radiation (if breast or lymphoma\(^2\))

Conduct CSF flow scan

Flow abnormalities

Flow normal

**POST-INDUCTION THERAPY**

- Consider increasing the interval of treatments between intra-CSF chemotherapy

Reassess CSF from site where positive CSF cytology was originally obtained; if CSF cytology was originally negative reassess by obtaining CSF from a different site

CSF cytology negative

Consider increasing the interval of treatments between intra-CSF chemotherapy

CSF cytology positive

Evidence of clinical or radiologic progression of leptomeningeal metastases?

Yes

Consider switching intra-CSF medication

- Radiation to symptomatic sites or
- Systemic chemotherapy and/or
- Best supportive care

No

Repeat CSF flow scan

CSF cytology continually positive and/or evidence of clinical or radiologic progression of leptomeningeal metastases\(^4\)

Repeat CSF flow scan

**FURTHER TREATMENT OPTIONS**

- Consider switching intra-CSF medications and treat for 4 weeks before re-testing CSF

Flow abnormalities

Repeat CSF flow scan

\(^1\) Induction intra-CSF chemotherapy can start after radiation
\(^2\) Depending upon the extent of the disease, consider appropriate radiation therapy
\(^3\) Usually WBRT and/or partial spine field recommended
\(^4\) Consider switching intra-CSF medications and treat for 4 weeks before re-testing CSF

\*Note: Consider Clinical Trials as treatment options for eligible patients.*

Approved by the Executive Committee of the Medical Staff on 09/26/2017
### APPENDIX A: Karnofsky Performance Status Scale Definitions

<table>
<thead>
<tr>
<th>Score</th>
<th>Description</th>
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<tbody>
<tr>
<td>100</td>
<td>Normal; no complaints; no evidence of disease</td>
</tr>
<tr>
<td>90</td>
<td>Able to carry on normal activity; minor signs or symptoms of disease</td>
</tr>
<tr>
<td>80</td>
<td>Normal activity with effort; some signs of disease</td>
</tr>
<tr>
<td>70</td>
<td>Cares for self; unable to carry on normal activity or to do active work</td>
</tr>
<tr>
<td>60</td>
<td>Requires occasional assistance, but is able to care for most of his personal needs</td>
</tr>
<tr>
<td>50</td>
<td>Requires considerable assistance and frequent medical care</td>
</tr>
<tr>
<td>40</td>
<td>Disabled; requires special care and assistance</td>
</tr>
<tr>
<td>30</td>
<td>Severely disabled; hospital admission is indicated although death not imminent</td>
</tr>
<tr>
<td>20</td>
<td>Very sick; hospital admission necessary; active supportive treatment necessary</td>
</tr>
<tr>
<td>10</td>
<td>Moribund; fatal processes progressing rapidly</td>
</tr>
<tr>
<td>0</td>
<td>Dead</td>
</tr>
</tbody>
</table>

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Baseline testes, particular to MD Anderson and the following: MD Anderson’s specific patient population; MD Anderson’s services and structure; and MD Anderson’s clinical information. Moreover, this algorithm is not intended to replace the independent medical or professional judgment of physicians or other health care providers. This algorithm should not be used to treat pregnant women.

SUGGESTED READINGS


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DEVELOPMENT CREDITS

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