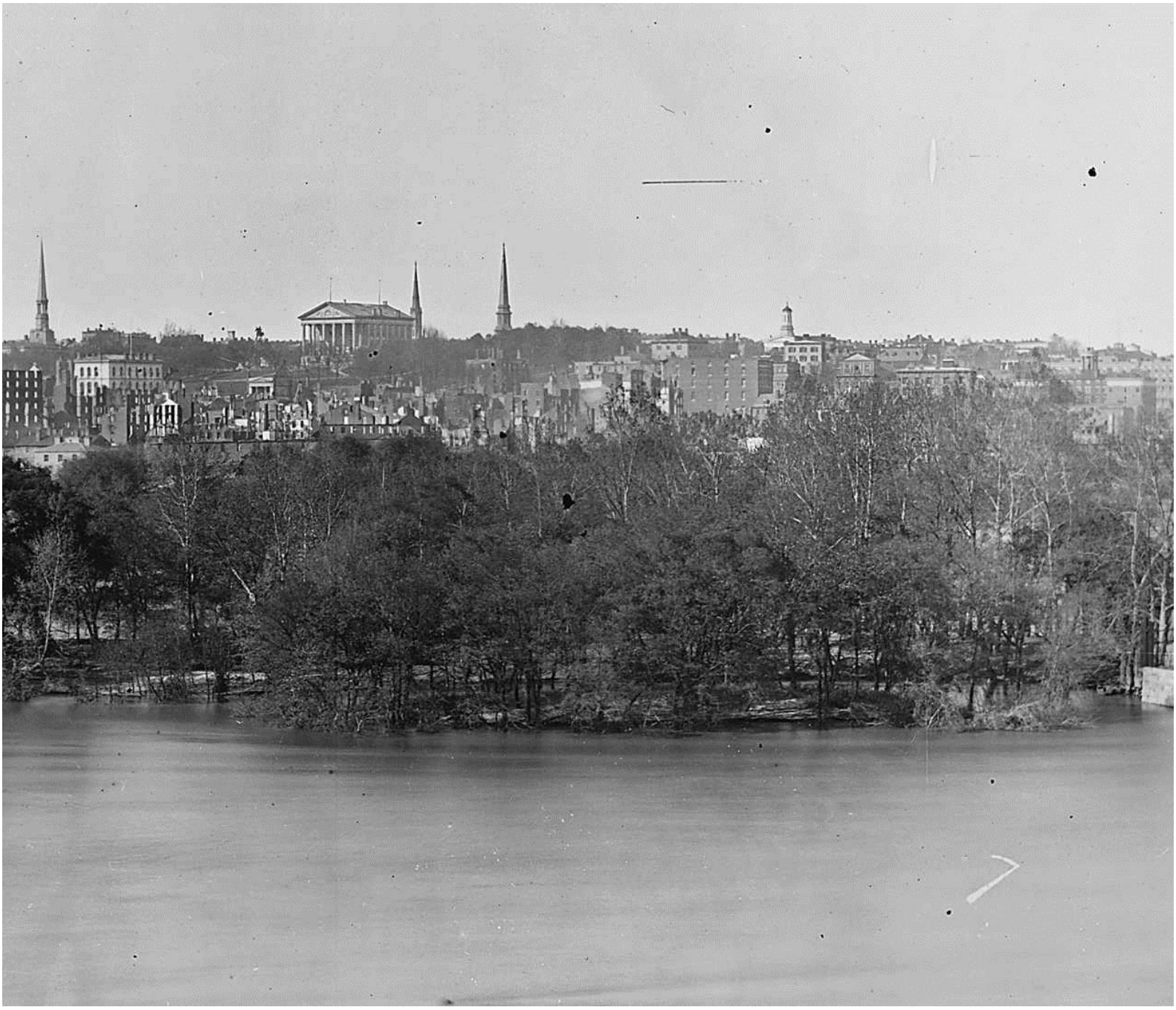
THE NORTHERN HOSPITAL

MALIGNANT SPINAL CORD COMPRESSION



Richmond, Virginia, period of the Civil War.

From McClellan's lines, you could hear the bells of Richmond tolling. You could hear the Church bells and the public clocks striking, he was that close.

(Shelby Foote)

A worried Jefferson Davis now prepared for a siege of Richmond, relying more and more on the advice of his close military adviser, Robert E. Lee.

When Davis asked where Lee thought the South's next defensive line should be drawn once Richmond fell, Lee said, "Richmond must not fall. It shall not be given up".

Still, George McClellan refused to attack. Though his army still outnumbered the rebels, he remained convinced the opposite was true. One observer noted that McClellan had a particular faculty for "realizing hallucinations".

He demanded another 40,000 men.

"If he had a million men, he would swear the enemy had two millions, and then he would sit down in the mud and yell for three!".
(Edwin M. Stanton).

With the year half gone, the Union's grand strategy had stalled. The western campaign begun by U.S Grant had ground to a halt in North Mississippi, and McClellan's mighty forces were paralyzed in front of Richmond….

On the Virginia Peninsula, the rains came, inundating the bottom-lands. Along the roads outside Richmond George McClellan's force was divided in two by the flooded Chickahominy River. The Rebels saw their chance and attacked the smaller force on May 31st. In the fierce fighting that followed the Confederates did best near a crossroads called Seven Pines. The Union soldiers were most successful at Fair Oaks. When the battle at Fair Oaks was over the North had lost 5,000 men, the South, 6000 and it hadn't changed a thing.

Joseph Johnston, the overall Confederate commander, was himself severely wounded and carried from the field.

"The shot that struck me down was the best ever fired for the Confederacy, for I possessed in no degree the confidence of the government, and now a man who does enjoy it will succeed me and be able to accomplish what I never could.
(Confederate General Joseph Johnston)

"His name might be audacity. He will take more chances, and take them quicker than any other general in this country, North or South".
(Sam Watkins, Confederate soldier).

Now for the first time in the war, Robert E Lee was placed at the head of a major army. "I prefer Lee to Johnston. Lee is too cautious and weak under grave responsibility. Personally brave and energetic to a fault, he is yet wanting in moral firmness when pressed by heavy responsibility" (General George B. McClellan).

McClellan completely misjudged the new Confederate commander. Robert E Lee was a fighter. Wanting to get at the Union men who had dared invade his state, Lee renamed his force the Army of Northern Virginia, seized the initiative, and never let it go.

First, Lee sent his cavalry chief Jeb Stuart, to reconnoiter McClellan's forces. Stuart now led 1,200 troopers on a pounding three day, 150 mile ride around McClellan's huge army. His men burned federal camps, cut down telegraph poles, took prisoners and horses and mules, and slowed only to accept bouquets and kisses from women along the way. In vain pursuit was Stuart's own father-in-law, who had stayed loyal to the Union and become a general - a decision Stuart said he would "regret but once, and that will be continuously".

Throughout the whole campaign, Lee carefully observed McClellan's tentative advance up the Peninsula. As McClellan was preparing at last to lay siege to Richmond, Lee surprised him first, at Mechanicsville on June 26th. It was a daring move.

Defying all military convention, Lee divided his tiny force and then attacked the huge Union army, gambling that McClellan would be too cautious to move into Richmond. Lee's assault didn't work. He lost 1,500 men at Mechanicsville, but he would not let up. Determined to drive McClellan out of Virginia, Lee kept on the attack and so it went. For seven days, the two armies clashed. From Gaine's Mill…from Savage's Station…to Frayser's Farm…and Malvern Hill, where federal gunners stopped the Confederates who came at them up the long slope.

"Our ears had been filled all night with agonizing cries before the fog was lifted. But now our eyes saw that 5,000 dead or wounded men were on the ground. A third of them were dead or dying, but enough of them were alive and moving to give the field a singular crawling effect".
(Union soldier)

"Each of the battles of those seven days brought a harvest of wounded to our hospital. I used to veil myself closely as I walked to and from my hotel, that I might shut out the dreadful sights. Once I did see one of those dreadful wagons. In it a stiff arm was raised, and it shook as it was driven down the street, as though the dead owner appealed to heaven for vengeance".
(Union Nurse)

All but one of the battles of the Seven Days were Union victories, yet McClellan treated them as defeats, continuing to back down until he reached the safety of Federal gunboats at Harrison's Landing on the James River. Union officers urged a counter attack. Lee had lost 20,000 men. McClellan refused. One officer suggested his commander was motivated either by "cowardice or treason"
(Shelby Foote, Civil War Historian).

In just one week, Lee had completely unnerved the Union general and demonstrated for the first time the strengths that would make him a legend - surprise, audacity, and an eerie ability to read his opponent's mind. In just seven days, McClellan had been totally out-generaled.

"I am tired of the sickening sight of the battlefield, with its mangled corpses and poor suffering wounded. Victory has no charms for me when purchased at such cost".
(George McClellan).

On July 7th an exasperated Lincoln sailed down to see his commanding general. He had not lost, McClellan insisted. He had merely failed to win. He needed 50,000 more men, or perhaps 100,000. No such numbers were available, Lincoln told him. If McClellan did not feel he could resume the offensive, his men would be withdrawn from the Peninsula.

"If I gave McClellan all the men he asks for, they couldn't find room to lie down, They'd have to sleep standing up. Sending men to that army is like shoveling fleas across a barnyard - not half of them get there".
(Abraham Lincoln).

"September 3. Today we took a steamer and went up the Potomac past Washington and landed at Georgetown. It is hard to have reached the point we started from last March, and Richmond is still the rebel capital".
(Elisha Hunt Rhodes - Union private).

David McCullough and Shelby Foote in Ken Burns', "The Civil War", 1990.

By June McClellan had his army entrenched outside Richmond, now half surrounded. The North confidently awaited the final climactic and inevitable annihilation of the Confederacy. But on June 25th, against all expectations, Lee struck first. Over the next seven days, in a series of astonishingly audacious and bloody battles, Lee completely out manoeuvred McClellan. Never relinquishing the initiative, he sent him reeling from Richmond, and scrambling all the way back to the safety of the James River. In just seven days Lee had defeated the great Army of the Potomac and saved Richmond and the Confederacy. The Battle of the Seven Days, as it became known, would mark the first inkling of the emergence of one of history's greatest field commanders - Robert E. Lee.

Though General George B. McClellan, was a superb organizer and trainer of armies, on the actual field of battle, it was quantity that became the overriding factor for success in his eyes. Though it is a general truism that "God is on the side of the big battalions" - quantity in isolation is no ironclad guarantee of victory, rather it is the quality of command that often proves the more decisive factor.

When we suspect a spinal cord compression in an oncology patient, we must like General Lee go on the immediate attack. We must never let up the initiative, until we have followed through to the end. Though we may not be able to offer ultimate victory, our strategy in the field will more about quality of life than about its quantity.

General George B. McClellan, 1862, photograph by Mathew Brady.

"I prefer Lee to Johnston. Lee is too cautious and weak under grave responsibility. Personally brave and energetic to a fault, he is yet wanting in moral firmness when pressed by heavy responsibility" (General George B. McClellan).

MALIGNANT SPINAL CORD COMPRESSION

Introduction

Oncology patients are at risk from spinal metastases, and as such are at risk from spinal cord compression.

Malignant spinal cord compression is a relatively common problem in oncology and it represents a true oncology emergency.

Any oncology patient that presents with leg weakness must have a spinal cord lesion ruled out.

Any oncology patient that presents with back pain must be considered to have malignant involvement till proven otherwise.

Pathophysiology

Sources

Any cancer can cause malignant spinal cord compression, but the most commonly seen causes are bony spinal metastases associated with:

1. Breast.
2. Lung.
3. Prostate.
4. Myeloma.
5. Renal cell carcinoma.

Mechanisms

1. Bony metastases / vertebral collapse:
    - Most spinal cord compressions develop from tumours metastatic to the vertebral bodies that subsequently erode into and encroach on the spinal cord.
    - The thoracic spine is the most common location for metastases that cause malignant spinal cord compression
2. Paraspinal invasion:

- Less commonly, tumours such as lymphomas, sarcomas, and lung cancers that occupy the paraspinous spaces may enter the spinal canal through the intervertebral foramen and cause cord compression.

  Such tumours are important to recognize because, although they may not cause direct bony destruction, they can still lead to spinal cord damage.

3. Epidural tumour:

   - Epidural tumour can cause direct compression of the neural elements again without associated bony destruction being seen.

4. Vascular lesions:

   - Venous plexus obstruction can cause marked cord edema, whereas tumour occlusion of the arterial blood supply to the spinal cord creates an acute infarction, leading to abrupt and irreversible cord ischemia.

   - Epidural hematoma:

     Bleeding from a spinal dural mass, may also lead to cord compression, via an expanding epidural hematoma.

Clinical Assessment

Important aspects of assessment include:

1. Index of suspicion:

   - **Early diagnosis is vital to prevent further neurologic compromise and to maintain functional status and quality of life.**

     A high index of suspicion for malignant spinal cord compression is therefore essential in any oncology patient.

2. Do not expect "typical" signs on all occasions:

   - **Patients may merely present with limb "weakness"**

     Spinal cord compression must be *considered* in any oncology patient with back pain and/or leg weakness, no matter how subtle, with or without leg weakness, with or without bowel or bladder dysfunction.

   - Consider spinal cord compression in any patient with increasingly severe back pain, often with localized tenderness.

   - **Do not** expect "classical" or "objective" neurological signs.

The classical findings of a sensory level and UMN signs occur late and imply irreversible damage.

3. Differential diagnoses:

    - Whilst "general debility" or a steroid myopathy may be causes of leg weakness in oncology patients, these must remains **diagnoses of exclusion in the first instance.**

Investigation

Blood tests

1. FBE
2. U&Es/ glucose
3. Coagulation profile
4. Calcium and phosphate

Plain Radiography

This can only give indirect clues to bony involvement but cannot definitively diagnose malignant spinal cord compression.

CT Scan

CT scan may give useful information, and is a far better option than plain radiography, however again it cannot definitively rule out malignant spinal cord compression

MRI

MRI is the definitive imaging modality

Spinal cord compression may be present even in the setting of normal x-rays, CT scan or bone scan.

Note that Radiologists usually prefer to image by regional or vertebral levels (as opposed to a time consuming *routine* scan of the entire spine) – however it is vital that the area scanned be as wide as possible, especially when symptoms are not well localized or lie near junctions of segments (i.e. cervical/ thoracic/ lumbar/ sacral) where it is best to image *both adjacent segments routinely* to ensure that the scan does not miss the region of pathology.

Some centers will routinely scan the entire spine as the safest approach.

Management

1. IV dexamethosone:

    - Any patient suspected of having a spinal cord compression due to metastases should have IV dexamethosone immediately.

    - When clinical suspicion is high, this should be given even before imaging investigation results.

    - **Dexamethasone is the most commonly used corticosteroid and is typically given as an initial intravenous dose of 10 - 16 mg followed by 4 mg every 4 hours.** [1]

2. Surgery or radiotherapy:

    - The subsequent management decisions (neurosurgery or radiotherapy) require the assessment of a specialized unit.

    - The stability of the spine and overall patient "fitness" factors will need to be taken into consideration.

    - There is some evidence to suggest that neurological outcomes are improved if surgery rather than radiotherapy is chosen to treat spinal cord compression if there is a single level of compression and a "fit" (for surgery) patient.

Disposition:

Spinal cord compression in an oncology patient should be discussed urgently with:

- **Oncology**

- **Neurosurgery**

"September 3. Today we took a steamer and went up the Potomac past Washington and landed at Georgetown. It is hard to have reached the point we started from last March, and Richmond is still the rebel capital".

Elisha Hunt Rhodes

References

1. Halfdanarson T. R et al. Oncologic Emergencies: Diagnosis and Treatment, Mayo Clin Proc. June 2006; 81(6): 835 - 848.

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