Myths in Emergency Medicine
Fact or Fiction?

Kip Wenger, DO, FACOEP, FACEP
University of Tennessee Medical Center

What is a Myth?

• Myths are widely held beliefs that are not supported by facts or scientific evidence
• Myths are not necessarily false
• How can myths exist in this world of evidence based medicine?
How are Myths Created and Maintained?

- Myths intuitively make sense
- This is what I saw an “expert” do and I want to be an expert some day so.…
- Myths once they are published in a book or journal become identified as facts
- Myth preservation ???

Confirmation Bias
Myth Preservation

- “I know that most men, including those at ease with problems of the greatest complexity, can seldom accept the simplest and most obvious truth if it be such as would oblige them to admit the falsity of conclusions which they have proudly taught to others, and which they have woven, thread by thread, into the fabrics of their life”

Leo Tolstoy
Myths in Emergency Medicine
Identification and Approach

• Concepts and treatments that I have seen my partners and I teach and perform with a high level of teacher certainty but with a large amount of teacher variability

• What were we taught, what is in the book, what is in the literature, and what can we conclude

EM Myth Classification

• Pharmacologic myths
• Procedural / non drug treatment myths
• Diagnostic evaluation / testing myths
• Pathophysiology myths
Myths in Emergency Medicine

- LP and recumbency
- “Spider bites”
- Packing cutaneous abscesses
- Hypertensive urgency
- Hypertensive epistaxis
- Morphine for CHF
- STEMI vs. ST depression
- Sodium Polystyrene Sulfonate
- Pharmaceutical industry influence

Other Myths

- Trendelenburg
- Cricoid pressure
- D-Dimer testing
- Tetracaine for corneal abrasions
- Prothrombin concentrate
- FFP for coagulopathy
- Foley clamping for urinary retention
- Nasal packing and antibiotics
- TPA and the “Lazarus effect”
1) Myth: You Must Stay Recumbent For The Next (__) Hours After Your LP!

- What were you taught?
- What the book says: Roberts and Hedges 4th Ed. “The influence of activity on post spinal puncture headaches has been studied with contradicting results including worsening of, improvement in, and no effect on the incidence of headaches when patients were mobilized.”

Recumbency Post LP Literature

- Bed Rest: A potentially harmful treatment needing more careful evaluation. Lancet 1999
  - evaluating the efficacy of bed rest in 39 trials
  - no advantage of bed rest after spinal puncture
- Prevention of post-lumbar puncture headaches: Neurology 2000
  - 32% incidence of headache after lumbar puncture
  - no evidence that spinal headache is influenced by recumbency
Recumbency Post LP Literature

• Assessment: Prevention of post lumbar puncture headaches. Neurology 2004
  – 111 children age 2-17
  – randomized in 2 groups.
  – 24 hours of bed rest verse immediate mobilization
    • 2% headaches in the immediate mobilization group
    • 15% headaches in the bed rest group

Recumbency Post LP Literature

No effect of recumbency duration on the occurrence of post-lumbar puncture headache. BMC Neurol 2012;12

• 70 consecutive patients had LP’s
• Overall frequency of PLPH 31%
• No difference with 1 vs 4 hours of recumbency
• Conclusion: Incidence of PLPH with 1 vs. 4 hour of recumbency is not changed
Conclusion: Recumbancy Post Lumbar Puncture

The literature does not support the recommendation of routine bed rest following lumbar puncture.

2) Myth: Another Spider Bite

- What you were taught?
- What the book says:
- Tintinalli 7th Ed. “Definitively diagnosing brown recluse envenomation is difficult. It is likely that a large number of wounds are incorrectly attributed to the bite of the brown recluse spider”
2) Myth: Another Spider Bite
Another Spider Bite

Literature

• Medical myth; idiopathic wounds are often due to brown recluse or other bites; Vetter West J Med 2000
  – the biologic distribution of the spider is limited
  – spiders don’t seek mammals
  – diagnosis based on the dermatologic findings are inaccurate

Another Spider Bite

Endemic Distribution of Brown Recluse

Figure 2: Endemic distributions of the brown recluse (stippling) and related recluse species (lines) in the United States, based on Gertsch and Ennil.4 Recluse populations become sporadic on either side of the demarcating range borders.
Another Spider Bite
Literature

• Journal Med Entomol 2005 Vetter
  – internet offer to identify any spider believed to be a brown recluse
  – 1773 submissions from 49 states
  – No recluse spiders were submitted in 25/29 states outside the range
  – Brown recluse spiders are very rare outside their endemic distribution

Another Spider Bite
Literature

• Necrotic arachnidism; the mythology of a modern plague. Ibister Lancet 2004
  – Australian paper
  – contends that the attribution of a spider bite in necrotic wounds comes from fear
  – the association of necrotic ulcers and spiders remains despite lack of evidence to support the involvement of spiders in necrotic ulcers.
Necrotic Wound Differential Diagnosis

- Staph or Strep infection
- Erythema multiforme
- Diabetic ulcer
- Lyme disease
- Fungal infection
- Pyoderma gangrenosum
- Lymphomatoid papulosis
- Squamous cell carcinoma

Conclusion: Necrotic Arachnidism

- In the majority of patients presenting with a necrotic wound the etiology will be a non-arachnid source

- Community acquired MRSA is commonly misidentified as a “spider bite”
Visits to the Emergency Department for cutaneous abscesses more than doubled from 1.2 million to 3.3 million from 1996 to 2005

3) Myth: The Value of Packing a Simple Cutaneous Abscess

What were you taught?

- What’s in the book: Tintinalli 7th Ed. pg 1019; “pack abscess cavity loosely with gauze ribbon to hold the cavity open and promote drainage”
- “keep packing in place long enough for cavity to heal from the inside out and to prevent the recollection of pus”
Packing Cutaneous Abscesses
Literature


• 474 surveys to 15 ED’s
• 85% used a linear incision
• 32% sent cultures (variability by type of provider)
• 48% used irrigation after I&D
• 91% used packing

Packing Cutaneous Abscesses
Literature

Routine packing of simple cutaneous abscesses is painful and probably not necessary Acad Emerg Med 2009, O’Malley

• Pilot study involving 48 pts with < 5 cm abscess
• Randomized to packing or no packing group
• Higher post procedure pain score in packing group
• No increase in morbidity in the “nonpacked” group
Packing Cutaneous Abscesses

Literature

Randomized trial comparing wound packing to no wound packing following incision and drainage of superficial skin abscesses in the pediatric emergency department. Pediatr Emerg Care. 2012

– 57 patients with cutaneous abscess needing I&D
– randomized into pack vs non pack group
– Conclusion: wound packing does not appear to significantly impact the failure or recurrence rates after simple I&D

Packing Cutaneous Abscesses

Conclusion

The clinical utility of packing a simple cutaneous abscesses is questionable and is associated with increased procedural pain
4) Myth: Hypertensive Urgency

- What were you taught?
- What the book says: Tintinalli 6th Ed. “The main challenge for the clinician is differentiating asymptomatic hypertension from hypertensive urgency. If target organ dysfunction is not evident, the clinician must judge whether significant risk of such damage is pending. Unfortunately no evidence-based data exist to guide the practitioner in this regard”

Hypertensive Urgency Literature

- Veterans administration cooperative study JAMA 1967
  - 143 patients with diastolic BP between 115-130
  - randomized to placebo and control group
  - no adverse events in the placebo group for the first 2 months
  - increased complications increased in the placebo group
  - study discontinued after 18 months (21/1)
Hypertension and President Roosevelt

- 1937 = 169/98
- 1941 = 188/105
- 1944 = 226/118
- 1944 = 260/150
- 1945 = 260/150
- 4/12/45 deceased

Hypertensive Urgency Literature

  - evidence supports the 2 extremes
  - there is no consensus regarding “hypertensive urgencies”
  - best evidence is from a study that can’t be repeated
  - patients with very high BPs are best managed by referral for treatment “not urgently but for life”
Hypertensive Urgency Literature

Treatment of Hypertension in Patients 80 Years of Age and Older. HYVET Trial. NEJM 2008

- 3845 patients ≥80 yo with systolic BP > 160
- Assigned to diuretic or placebo for 2 years
- 30% reduction in the rate of stroke (51/69)
- 21% reduction in death
- 64% reduction in the rate of CHF
- Study terminated prematurely for ethical reasons

<table>
<thead>
<tr>
<th>Age (years)</th>
<th>Hypertensive Population</th>
<th>BP goal</th>
</tr>
</thead>
<tbody>
<tr>
<td>≥ 60</td>
<td>General</td>
<td>&lt; 150/&lt;90</td>
</tr>
<tr>
<td>&lt;60</td>
<td>General</td>
<td>&lt;140/&lt;90</td>
</tr>
<tr>
<td>≥ 18</td>
<td>CKD</td>
<td>&lt;140/&lt;90</td>
</tr>
<tr>
<td>≥ 18</td>
<td>DM</td>
<td>&lt;140/&lt;90</td>
</tr>
</tbody>
</table>

CKD: Chronic kidney disease
DM: Diabetes Mellitus
**Recommended ED Hypertension Treatment Protocol**

<table>
<thead>
<tr>
<th>Systolic Blood Pressure (mm Hg)</th>
<th>Diastolic Blood Pressure (mm Hg)</th>
<th>Follow-up</th>
</tr>
</thead>
<tbody>
<tr>
<td>120–140</td>
<td>or 80–90</td>
<td>Advise f/u</td>
</tr>
<tr>
<td>140–160</td>
<td>or 90–100</td>
<td>Advise f/u within 2 months</td>
</tr>
<tr>
<td>↑ 160</td>
<td>or ↑ 100</td>
<td>Advise f/u within 1 month</td>
</tr>
<tr>
<td>↑ 180</td>
<td>or ↑ 110</td>
<td>Consider initiating therapy at discharge</td>
</tr>
<tr>
<td>↑ 200</td>
<td>or ↑ 120</td>
<td>Follow-up within 1 week</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Begin antihypertensive therapy at discharge Follow-up within 1 week</td>
</tr>
</tbody>
</table>

f/u, follow-up.
Conclusion:
Hypertensive Urgency

- Hypertensive emergency is not defined by the level of BP elevation
- Treatment decisions should not be based on a single set of vital signs
- More patients have been injured by aggressive ED treatment of “hypertensive urgencies” than helped
- Most patients without evidence of end organ damage can be safely discharged with close follow-up

5) Myth: Hypertension is a Proximal Cause of Epistaxis

- What were you taught?
- Tintinalli 7th Ed. : “rapid reduction of blood pressure during an episode of acute epistaxis is generally not advised”
Epistaxis and hypertension. Postrad Med 1977

- 194 pts admitted for epistaxis. 26 patients predisposed to epistaxis had age and sex-adjusted systolic and diastolic scores similar to those of the general population. 168 patients with no predisposition formed a different population with significantly higher age and sex-adjusted systolic and diastolic scores

- Conclusion: “epistaxis is a true symptom of hypertension”

Hypertension and Epistaxis

Literature

• Absence of association between hypertension and epistaxis. Blood Press 2003
  – 1174 people > 18 yo
  – history of epistaxis was not associated with hypertension
  – epistaxis was associated with allergic rhinitis

Hypertension and Epistaxis

Literature

Serious spontaneous epistaxis and hypertension in hospitalized patients. Eur Arch Otorhinolaryngol. 2011 Dec
• study to evaluate the role of hypertension in patients hospitalized with severe epistaxis
• 219 patients classified into serious and severe epistaxis
• Hypertension did not appear to be a significantly causal factor in the severity of epistaxis
Conclusion
Hypertension and Epistaxis

- Patients that present to the ED with epistaxis are often hypertensive
- In most patients with anterior epistaxis their elevated blood pressure is the result of their epistaxis
- Most patients that present with anterior epistaxis don’t require emergent blood pressure treatment

6) Myth: Morphine Sulfate Treatment of Congestive Heart Failure

- What you were taught?
- What the book says: Tintinalli 6th Ed. “Morphine can be used to treat acute pulmonary edema, provided there is adequate BP. Despite its long historical use there are no studies demonstrating efficacy”
- Tintinalli 7th Ed. “morphine is no longer recommended”
CHF and Morphine Literature

• Hospital treatment of CHF; Amer J Med 1978
  – “Morphine is the single most important drug in the treatment of pulmonary edema. It is a potent vasodilator, a weak inotropic agent and a sedative. Immediate phlebotomy of 100-500 cc should be considered (or rotating tourniquets) when initial therapy is ineffective”

CHF and Morphine Literature

• Comparison of NTG, morphine, and furosemide in treatment of presumed pre-hospital pulmonary edema Chest 1987; 57 patients and 4 protocols
  – A) NTG + furosemide
  – B) morphine and furosemide
  – C) morphine, furosemide, NTG
  – D) NTG and morphine
  – Group A had significantly greater improvement than Group B
CHF and Morphine Literature

  – retrospective review of 181 patients
  – administration of morphine was associated with increased likelihood of intubation and ICU admission
  – Does not establish causality

CHF and Morphine Literature

• 147,362 hospitalizations
• 20,782 pts give morphine
• No clinically significant differences in age, BP, or EF
• 15.4% of morphine group intubated vs 2.8%
• 13.0% of morphine group died vs 2.4%
• After risk adjustment exclusion of intubated patients morphine use was an independent predictor of mortality
Conclusion: Congestive Heart Failure and Morphine Sulfate

- There is no good evidence supporting the use of morphine sulfate in the treatment of acute pulmonary edema
- The greatest value of morphine in the setting of CHF is in its role as an anxiolytic. Benzodiazepines are hemodynamically better tolerated

7) Myth: “Fortunately your EKG just shows ST segment depression and not a Heart Attack”

Which EKG would you pick as **yours** if you had to choose one?

- A
- B
- C
A. ST Depression

B. Inferior Wall MI
C. Anterior Wall MI

UA / Non STEMI versus STEMI
Mechanisms of Long Term Outcomes

ST ↓ Necrosis by closed Muscle → Arrhythmias CHF → Death

ST ↑ Necrosis by closed Artery
Six-Month Mortality by Baseline ECG Findings
GUSTO-IIb Results

Patients with ST↓: Likely to Have Higher Risk Medical Histories than Patients with ST↑

<table>
<thead>
<tr>
<th>Medical History</th>
<th>ST↑ (%)</th>
<th>ST↓ (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prior MI</td>
<td>20%</td>
<td>32%</td>
</tr>
<tr>
<td>Prior CABG Surgery</td>
<td>6%</td>
<td>13%</td>
</tr>
<tr>
<td>Prior PCI</td>
<td>6%</td>
<td>13%</td>
</tr>
<tr>
<td>Prior Angina</td>
<td>52%</td>
<td>78%</td>
</tr>
<tr>
<td>Hypertension</td>
<td>41%</td>
<td>51%</td>
</tr>
<tr>
<td>Diabetes</td>
<td>17%</td>
<td>20%</td>
</tr>
<tr>
<td>Hypercholesterolemia</td>
<td>36%</td>
<td>42%</td>
</tr>
<tr>
<td>Prior CHF</td>
<td>4%</td>
<td>8%</td>
</tr>
</tbody>
</table>
ST Depression Signifies Likelihood to Require High-risk Revascularization

<table>
<thead>
<tr>
<th>No. diseased vessels</th>
<th>ST↑ (n=1864)</th>
<th>ST↓ (n=2170)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>10%</td>
<td>11%</td>
</tr>
<tr>
<td>1</td>
<td>45%</td>
<td>26%</td>
</tr>
<tr>
<td>2</td>
<td>27%</td>
<td>28%</td>
</tr>
<tr>
<td>3</td>
<td>18%</td>
<td>36%</td>
</tr>
</tbody>
</table>


Conclusion: “Fortunately your EKG just shows ST segment depression and not a Heart Attack”

- Our current emphasis is on STEMI
  - EKG in < 10 minutes of arrival, ASA, Beta blockers, Door to balloon time < 90 minutes
- We should not forget that the 6 month mortality for the ACS patient with ST segment depression is higher than for the STEMI
8) Myth: Sodium Polystyrene Sulfonate is Effective in the treatment of Hyperkalemia

• What were you taught?
• What the book says: Tintinalli 7th Ed. “Administer 25-50 grams PO or PR with onset of action 1-2 hrs.”

8) Myth: Sodium Polystyrene Sulfonate is Effective in the Treatment of Hyperkalemia

Literature

• Has been used / marketed since 1958
• The FDA did not require manufacturers to prove efficacy or safety until 1962
• The strongest evidence for SPS efficacy is in a 1961 NEJM article which showed a diminution in serum potassium of at least 0.4 mEq/L in 23 of 30 patients (N Engl J Med 264: )
Myth: Sodium Polystyrene Sulfonate is Effective in the Treatment of Hyperkalemia

**Literature**


- evaluated the effect of placebo and four single-dose resin-cathartic regimens on 5 different test days and 6 chronic renal failure patients
- None of the regimens reduced serum potassium concentrations, compared with baseline levels

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**Myth: Sodium Polystyrene Sulfonate is Effective in the Treatment of Hyperkalemia**

- Intestinal Necrosis due to SPS in Sorbitol. South Med J. 2009
  - Single hospital reviewed 11 pathology cases of intestinal necrosis after SPS therapy
  - 4 deaths
  - 2 were noncritical patients with K’s of 5.7 -5.8
  - Symptoms of intestinal necrosis developed between 3-11 days
8) Myth: Sodium Polystyrene Sulfonate is Effective in the treatment of Hyperkalemia

Literature


Review of the Sodium Polystyrene Sulfonate (SPS) literature and concludes "we can find no convincing evidence that SPS increases fecal potassium losses in experimental animals or humans ..."

8) Conclusion: Sodium Polystyrene Sulfonate is Not Effective in the Treatment of Hyperkalemia

The FDA advises against the use of SPS in patients who do not have normal bowel function or those who are at risk for constipation or impaction. SPS should be discontinued in patients who become constipated, and repeat doses should not be given to patients who have not passed a bowel movement.
But Wait there is More!

- October 2015 FDA approved Veltassa, patiromer for the treatment of hyperkalemia
- Oral, nonabsorbed, polymer suspension that bonds K in exchange for Ca
- Works predominantly in the distal colon
- 76% effective at normalizing potassium
- 4X more effective than placebo (not kayexalate)
- Works within 4 weeks ie not indicated for emergent treatment of hyperkalemia

9) Myth: The Pharmaceutical Industry Doesn’t Influence Prescribing

- What were you taught?
- What the book says?
Pharmaceutical Industry Literature

• Interactions between pharmaceutical representatives and doctors in training. Gen Int Med August 2005
  – Contact was common
  – Most physicians thought the interactions were appropriate
  – A minority thought their prescribing was influenced
  – Residents reported insufficient training in understanding the pharmaceutical business

Pharmaceutical Industry Literature

• Ashley Wazana, “Physicians and the Pharmaceutical Industry: Is a Gift Ever Just a Gift?” Journal of the American Medical Association

• In 2012 the pharmaceutical industry spent:
  – 27 billion dollars on drug promotion
  – 3 billion spent on direct consumer advertising
  – 72,000 sales representatives
Source: Cagedim Strategic Data, 2012
Pharmaceutical Company Promotion

Expenditure by Type of Pharmaceutical Marketing (2012)

- $15 billion
- $1.2 billion
- $2 billion
- $5.7 billion
- $90 million
- $3.1 billion
- $130 million

- Detailing (face-to-face sales and promotional activities)
- Clinical trials
- Samples (free medication provided to physicians)
- Educational and promotional meetings
- Promotional mailings
- Advertisements (print)
- Direct-to-consumer advertising

2012 US Prescription Drug Sales??

- 11% of sales spent on research
- 27% of sales spent on marketing
- Research job growth is flat
- Pharmaceutical Research and Manufacturers of America (PhRMA)
2014 US Prescription Drug Sales  
$374,000,000,000

- 1,100-plus paid lobbyists
- $2.7 billion spent on lobbying between 1998-2013
- The pharmaceutical industry spends 42% more than the second highest paying industry on …?

Pharmaceutical Industry Literature


- In 2011, the pharmaceutical and medical device industries provided 32 percent of all funding for continuing medical education courses in the United States—$752 million out of $2.35 billion
Pharmaceutical Industry Literature

Availability of references and the sponsorship of original research cited in pharmaceutical advertisements: Can Med J; Feb 2005

– 438 pharm advertisement reviewed
– 71% had references
– 19% of the references were “data on file”
– 51% of the data on file was not available
– 8% of references appeared to be “original” research

Pharmaceutical Industry Literature

Medical journals are an extension of the marketing arm of pharmaceutical companies; PLOS Med May 05, Smith

– RCT’s are considered the highest form of evidence
– 3/4 of the RCT’s in major journals are industry sponsored
– 70% profit margin for reprints (positive results=§)
– Author suggests journals should stop publishing trial results
Conclusion: The Pharmaceutical Industry Does Influence Prescribing

- The pharmaceutical industry influences physician prescribing behavior
- Evidence based medicine requires accurate evidence however in many cases the evidence is influenced by the pharmaceutical industry

Conclusion

- Providing optimum quality care requires us to constantly examine, review, and update our practice
- Critical thinking requires intellectual humility “I thought I knew, but I merely believed”
- Evidence based medicine does not work if the evidence is not present, biased, or contradictory
The great enemy of the truth is very often not the lie; deliberate, contrived, and dishonest but the myth persistent, persuasive, and unrealistic. Belief in myths allows the comfort of opinions without the discomfort of thought.

John F. Kennedy

“The most difficult subjects can be explained to the most slow-witted man if he has not formed any idea of them already; but the simplest thing cannot be made clear to the most intelligent man if he is firmly persuaded that he knows already, without a shadow of doubt, what is laid before him”

Leo Tolstoy