EBM.

with NaCl

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The Art of Medicine

Definition of Art

1. skill acquired by experience, study, or observation • the art of making friends
2. a branch of learning: (1) one of the humanities (2) arts plural: liberal arts
   a. archaic: learning, scholarship
3. an occupation requiring knowledge or skill • the art of organ building
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Case

- 76 yo Hispanic female
- CC: SOB
- PMH: HF EF 25%, HTN, DM2, gout, COPD, mild dementia, breast cancer and hyperkalemia
- Hypotensive but tachycardic
- Questions:
  - BNP vs. proBNP? Track? Level and mort?
  - Bisoprolol vs. metoprolol hospital readmissions?
  - Any role for calcium channel blockers?
  - Entresto (sacubitril-valsartan)?
  - Ivabradine (Corlanor)?
  - Impact of dual diuretic therapy on risk of side effect?
  - Cardiac resynchronization therapy?
  - ICD?
  - Stem cells?
The SCIENCE of Medicine

The most dangerous phrase in the language is "we've always done it this way."
The **SCIENCE** of Medicine

- Personal experience, collective wisdom, intuition and physiologic sense are not always reliable
  - Beta blockers in heart failure
Lobotomies

Bloodletting

The Curative Powers of Mercury

Although the placenta is revered in many cultures, there is scarce evidence that any customarily eat the placenta after the newborn's birth. Those who advocate placentophagy in humans believe, without any scientific evidence, that eating the placenta prevents postpartum depression and other pregnancy complications.

Electrical Impotence Cures

Hemiglossectomy
What's the best treatment for stuttering? Doctors in the 18th and 19th centuries often cut off half the stutter's tongue.

Colon Cleanse
Challenging times for physicians

- Alternative medicine
- Fake news
- Big Pharma
- Health care reform
EBM

A brief history

- 1943: First double blind controlled trial [patulin for common cold]
- 1946: First randomized controlled trial [streptomycin for TB]
- 1970: Cochrane and the lack of evidence
- 1992: Guyatt and the conscientious use of evidence
EBM
What it is and what it is not?

- Evidence based medicine (EBM) was originally defined as the
  - Conscientious
  - Explicit
  - Judicious use of current best evidence

In making decisions about the care of individual patients.

- Goal: use the best available evidence in clinical practice and
  deemphasize intuition, pathophysiologic rationale, and
  unsystematic clinical experience
EBM

What it is and what it is not

1. identifies a clinically relevant question
2. makes use of the best scientific evidence to answer it
3. critically appraises the evidence
4. integrates the evidence with the clinical scenario and patients' values
Figure 2: The five steps of evidence-based medicine include the 5 A's: ask, acquire, appraise, apply, and assess.
EBM Principles

1. Not all evidence is created equal

2. Evaluation of the totality of evidence

3. Integrate patient’s values
EBM
What is it and what it is not

Best evidence

Patient values

Clinical experience
EBM
Limitations \textit{[the grain of SALT]}

Paradigm shift?

- Medicine history
  - Medicine has always use evidence (some form, experience and patient values)
  - Incorporation of scientific thinking is a natural product of progress
  - Evidence based chemistry? Evidence based psychology?
EBM
Limitations

- Not enough evidence available... Or resources...
  - Hundreds of questions generated daily
  - Randomized controlled trials are extremely expensive and time consuming
  - What to do when no evidence or partial evidence available
Case

66 yo male
CC: SOB
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Hypotensive but tachycardic

Questions:
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Clinical outcomes

- Mortality
- Symptom control efficacy
- Functional status
- Interactions/side effects
- Tolerability
- Readmission rate
- Length of hospital stay
- Patient satisfaction
- Exacerbation of comorbidities
- Compliance

- 10 questions per medication/intervention [Ivabradine]
- 10 medications/interventions per diagnosis [CHF, COPD, DM, etc.]
- 5 diagnoses in this patient

300 Questions?
Beta-blocker Trials in Heart Failure
Effects on Mortality

- Previous: 0.64
- Resolvd
- CIBIS II: 0.68
- MERIT: 0.67
- BEST: 0.65
- COPERNICUS
- Total: 0.74

Metaanalysis incl. 15202 patients
2243 deaths
Beta blocker meta analysis

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<th>Study</th>
<th>Year</th>
<th>N</th>
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<td>SENIORS</td>
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<td>18255</td>
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Overall ($I^2$-squared = 22.7%, p = 0.234)
EBM
Limitations

- Lack of evidence does not mean lack of efficacy
  - Stop using known medication since there is no research?
- Availability of evidence drives use of specific products
  - Activolol vs. Placebolol
  - 1. Population selection
  - 2. Control selection
  - 3. Outcome selection
    - Quality of life
    - Satisfaction with use
    - Compliance
EBM Limitations

- Evidence changes
  - The lower the glucose the better.... Except in patients with CAD
  - Beta blockers decrease peri-op mortality..... But may increase risk of CVA
  - The lower the BP the better... except in elderly patients (BP of 150 is fine)
- Conflicting evidence
  - Study A in favor, study against
  - Professional organization X EBM guidelines suggest A, same guidelines by professional organization Y suggest otherwise
EBM Limitations

- Conflicting evidence
EBM
Limitations

- P hacking
  - Statistical significance is not CLINICAL significance
  - Publication bias
EBM Limitations

- Is the evidence applicable to my patient?
  - Population
  - Intervention
  - Outcomes
  - Controls
  - Preponderance of evidence
EBM Limitations

- Thousands of studies are published weekly
- Most show marginal or no gains
- Limited time spent with patients
- NO studies on best ways to incorporate general evidence to individual patients
CASE: Bisoprolol for heart failure with low EF

- Is there evidence?
- Is the quality of the evidence good?
- Is there a preponderance of evidence?
- Is the evidence clinically meaningful?
- Is the evidence applicable to my patient?
- Is applying the best evidence the best practice in this case?
EBM
Limitations

- Tyranny of evidence
  - Statistically significant does not mean CLINICALLY significant
  - Is superiority worth it?
  - Legal liability if best evidence not applied
  - Why physicians use interventions not supported by EBM?
    - Physician preference
    - Liability
    - Statistically but not clinically superior
    - Patient preference
    - Insurance
    - No harm/little of intervention
EBM
Limitations

- Patients' preference
  - Ads targeting patients
  - Patient values
- Lack of understanding
- Impact of pharmaceutical add campaigns
- Power of social media
EBM Limitations

- Is it feasible to practice EBM all the time?
- Is there evidence that using EBM improves outcomes?
The ART of Medicine
Medicine Art or Science?

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Is medicine a science or an art? Or both?

Can science be a tool for an artist?
Theory of color
Anatomy
Chemistry of paint

EBM
Pharmacology
Anatomy
Physiology

Client
Experience/Skill

Patient
Clinical experience/Skill

- Healing
- Comfort
- Pt. Satisfaction
Medicine is a science because it has an organized body of knowledge which contains certain universal truth.

Medicine is an art because healing and comforting requires certain skills which are personal possessions of physicians.

Science provides the knowledge & art deals with the application of knowledge and skills.
Summary

- EBM is a tool in the practice of Medicine
  - Not perfect but the best we have
- No direct evidence to support EBM
  - Indirect evidence
- No research of strategies to best apply general research to specific patients, as of now, we are artists....
Prescription

- Nurture an inquisitive mind
  - try to question at least one assumption in every new patient presentation
- Develop critical appraisal skills
  - EBM is not perfect, like democracy....
- Identify EBM reliable resources
- Teach critical thinking
- Use EBM with a grain of salt