Understanding Acupuncture and How It Could Benefit Your Patients

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Integrative Medicine: Acupuncture and its integration into conventional medicine

Outlines

• Background
• Science behind
  – Analgesia
  – Anti-inflammatory
  – Nerve regeneration
• Clinical applications
• Case studies

Acupuncture

• Dates back >2,000 years
• “Yellow Emperor’s Inner Canon” 200 BC
• Originated in China
  • ➔ Taiwan, Korea, Japan, Europe, US
• One of the best known Complementary & Integrative Medicine
• Proven efficacy in pain management, nerve regeneration, nausea/vomiting, calming effects

Acupuncture in Research

• Research increased exponentially
  – Especially in the past 30 years
  – 1940s : 1-3/year
  – 2000s : >100/year
  – 2015: >200/year
• U.S. National Library of Medicine
  – PubMed
  – 22184 acupuncture references [April, 2015]
  – ~500 veterinary references

JAMA Internal Medicine

Acupuncture for Chronic Pain
Individual Patient Data Meta-analysis [H]

• 29 RCTs, 17,922 patients
• Back & neck pain, osteoarthritis, chronic headache, shoulder pain
• ACP is effective for the treatment of chronic pain
• True ACP significantly different from sham ACP

The Cochrane Collaboration

Acupuncture is documented to be effective in

• Chronic Back pain
• Acute pain, dental pain
• Knee osteoarthritis
• Headache
• Fibromyalgia
• Hypertension
• Postoperative/chemotherapy nausea and vomiting
• Improving pregnancy rates undergoing in vitro fertilization
• Arrhythmias
Insertion on needles into specific points on the body to cause a desired healing effect

**What is Acupoint?**

- **Shu Xue** = “communicating holes”
- Nervous system
- Areas under the skin/SQ
  - Free nerve endings
  - Blood vessels
  - Lymphatic ducts
  - Mast cells
- Low electrical resistance
- High electrical conductance

**How Does Acupuncture Works?**

- Interactions among:
  - Nervous system
  - Endocrine system
  - Immune system
- Simple in concept, Complex in action
- All take place at once
  - Local Effects
  - Spinal Cord Effects
  - Brainstem Effects

**Physiologic Mechanisms**

- Local or peripheral
- Spinal & Supraspinal

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**Tissue Microtrauma**

- Activates Hageman’s factor XII
- Mast cell degranulation
- Activates local coagulation cascade and complement cascade
- Reduces histamine, serotonin, proteases and bradykinin
- Increases plasminogen, protein kinases, gastric glucagon
- Increased blood & lymph flow to the area
- Increased local immune responsiveness
- Relaxation of muscles and tissues

Harris Gellman, 2002
Anesthesiology, 2014
Uses enkephalin & dynorphin to block incoming 'pain' messages

Pituitary releases β-endorphin into the blood and CSF

Spinal Cord & Brain Effects

Activates PAG and Raphe magnus, which inhibit pain transmission

Pomeranz, 1990
Harris Gellman. 2002

Analgesia

Hypothalamus activates descending analgesic system

Ventricular releases β-endorphin into the blood and CSF

Enkephalin

Dynorphin

Serotonin

Acupuncture Effects: fmRI

• 10 Healthy

• 10 CTS pain before Acp

• 10 Pain relief after Acp

Somatosensory cortex
Relieve pain
Improve plasticity


Sonic

Physiologic Mechanisms

• Local or peripheral
• Spinal & Supraspinal
• Somatovisceral (autonomic) effects

Shelby, 2 yr, SF, G. Shepherd

9/14/14 to 10/10/14
• Fungal diskospondylitis (aspergillus) at T8-9 & L4-5
• Voriconazole, Abelcet
• Tramadol, meloxicam, gabapentin, amantadine, fentanyl
• Severe back pain
• Poor appetite, not sleeping well

10/10/14
CSU Pain score 4/4:
uncomfortable at rest, barely tolerates any touch
• Stuporous, depressed, unresponsive to surroundings

10/10/14
10/15/15
Significant less pain
Sleep well
More involved in surroundings
Picking up toys
Eating more
Still difficulty getting up

10/16/15
Acute partial paralysis
X-ray revealed progression of disease
Human euthanasia

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Autonomic Somatovisceral Effects

- AP converges with visceral efferent
  - Causes reflexive interactions with internal organs
- Sympathetic effect:
  - GV-26
- Parasympathetic effect:
  - PC-6

Napadow et al., 2009; Huang et al., 2012

Autonomic Effects

**GV-26**

- ↑ HR, RR, SV, CO, BP
- Mortality of induced shock:
  - Controls = 100%
  - AP-treated = 25%
- Resuscitation for induced Apnea:
  - Non-AP = 40%
  - AP-treated = 88%
- Shorten recovery time from anesthesia (Gemma, 2012)

Schatt, 1993
Soll, 1991

Physiologic Mechanisms

- Local or peripheral
- Spinal & Supraspinal
- Somatovisceral (autonomic) effects
- Nerve Regeneration

Effects of maropitant, acepromazine, and electroacupuncture on vomiting associated with administration of morphine in dogs

R Koh et al. JAVMA, 2014

Acupuncture on Damaged Nerves

- 10 rats paralyzed by laminectomy T9-T10 paralysis
- Control and Acu: 5/grp
- Acu Tx: 30 min, once a day for 2 weeks

Doo C. Choi et al, 2010

Acupuncture-mediated inhibition of inflammation facilitates significant functional recovery after spinal cord injury.

Pain control
Functional recovery
Bladder dysfunction

Inhibits

- Microglia and Astroglia
- Proinflammatory factors

Increases

- Neurotropins
- Calcitonin gene-related peptide
- Oligodendrocyte precursor cells

Doo C. Choi et al. 2010
Prospective randomized controlled trials (N=50)

- Group 1: Prednisone + EA weekly or bi-weekly
- Group 2: Prednisone
- EA + Prednisolone
- Time to recover ambulation (10 vs 20 days)
- Regain of deep pain (50% vs 12.5%)
- Overall success rate: 88.5% vs 58.3%

Out of all dogs only those with Grade 4/5 may benefit from tapering doses of prednisone and EA.

Retrospective case series & prospective clinical trial (N=40)

- Group 1: DSX
- Group 2: EAP
- Group 3: DSX+EAP
- Clinical success: Grade 4/5 > Grade 1/2 or normal

Comparative study on decompressive surgery, electroacupuncture, and decompressive surgery followed by electroacupuncture for the treatment of dogs with degenerative disk disease with long-standing severe neurologic deficits:

- Retrospective case series & prospective clinical trial (N=40)
  - Group 1: DSX
  - Group 2: EAP
  - Group 3: DSX+EAP
  - Clinical success: Grade 4/5 > Grade 1/2 or normal

Physiologic Mechanisms

- Local effects
- Neural (opiod) humoral theory
- Neural (non-opiod) segmental gate theory
- Somatovisceral (autonomic) effects
- Nerve Regeneration
- Anti-inflammatory effects

Dopamine mediates vagal modulation of the immune system by electroacupuncture

- 12 mice induced sepsis/endotoxemia
- ACP vs Sham:
  - >80% survival (vs. <50%)
  - For 3 weeks and no late deaths
  - TNF, MCP1, IL6, INF-Y
  - Fever
  - Dopamine (4X)
  - Mediated via vagal modulation
  - Control inflammation septic shock, sepsis, endotoxemia, colitis, pancreatitis

What Acupuncture Could Help?

- Acute & Chronic pain
- MSK disorders
- Neurological disorders
- GI issues
- Side effects from drugs, chemotherapy/cancer
- Cognitive dysfunction
- Behavioral disorders
- Sleeping disorders
- Diseases not responsive to conventional Tx
- Pertussis/sepsis
When To Use Acupuncture?

- Integrated with conventional drugs
  - Reduce side effects of drugs
  - Reduce dosage of drugs
  - Reduce recovery time
- Integrated with post-surgery management
  - Pain control and reduce edema
  - Promote tissue healing
- Integrated with rehabilitation
  - Pain control
  - Improve nerve function and ambulation

What to Expect with Acupuncture?

- Effects may be seen
  - Immediately
  - Within a few days or weeks

- Effects are cumulative
  - Often need multiple treatments
  - 1-2 per week for 3-5 sessions

- Maintenance treatments: every 1-3 months
- Side effects: tiredness, increased thirst, soreness, minor bleeding, retained needle
  - Recover within 24 hours

Zeus, 3 y/o, MN, Dachshund

- Non-ambulatory acute paraparesis
- T12-13 lesion
- Rx: Pred, Tramadol
- A week later, slight improvement
- Grade 3/5

Lucy Lue, 8 yr, SF, Chihuahua

- Jump off couch ➔ Non-ambulatory Tetraparesis
- Rx: Pred, Methocarb, Tramadol
- After a week, slightly improved remained non-ambulatory
- Pain score 3/4
  - Stiff neck

Lucy Lue

- 3 days after 1st Tx
- 9 days after Tx started (after 4th Tx)
Daisy, 10 yr, FS, Dachshund

1/16/15
• Acute paraplegia
• Intact deep pain, Grade 4/5
• MRI: L1-2, L2-3 compression
• Left hemilaminectomy

1/20/15
• Remained paraplegia
• Slight-none improvement
• Grade 4/5

Mary, 11 yr, SF, Yorksgire Terrier

10/4/15
• Chair fell on her
• Obtunded, tetraparetic, head tilt, ventral strabismus, horizontal nystagmus
• Glasgow coma scale: 4+6+5=15

10/4-10/6:
• Slight improvement
• 10/6: Start acupuncture

Rosebud, 12 yr, FS, GR

1/20/15
• Acute inability to get up, falling to right side
• Horizontal nystagmus, right head tilt
• CBC, Chem, rads, US
• Dx: Peri. Vestibular disease
• Rx: Maropitant, meclizine

1/21/15
• Slightly better, able to rise, falling to the right
**Rosebud, 12 yr, FS, GR**

1/22/15

- Start acupuncture

**Marley, 1.5 y/o, FI, Bull Terrier**

2/26/2014

- Spinning & chasing tail
- Decreased appetite
- Weight lost
- Not sleeping well
- Dx: Compulsive behavior
- Rx: Fluoxetine 20mg q24h

3/19

- Mild improvement
- Sleep better
- Inappetence

**Marley**

- 3/28/2014
  - Acupuncture
- 4/8/2014
  - >50% improvement
  - Sleep much better
  - Normal appetite
  - Less spinning
  - Gained weight
- 4/22/2014
  - Continue improving
  - Only spin when excited

**Toby, 4 yr, MN, Yorkie**

4/28/15

- Non-ambulatory Tetraparesis
- Meningoencephalomyelitis of Unknown Aetiology
- Rx: Pred, Cytosar
- 4/30 & 5/1
  - Acupuncture

**“7” - 2 yo Brangus Cow**

6/29/15

- Ataxia, obturator nerve paralysis and prolapsed uterus
- Use hip riser to lift the cow 2-3 times/day for 20-30 mins
- If no improvement: Euthanasia

7/1/15

- Remained paralysis in the morning
- Started acupuncture at 5pm

**Right after 1st ACP**

**Day 2 after 2nd ACP**
Day 3 after 3rd Acupuncture

And they live to see another day...

Take Home Messages

- Multi-mechanisms:
  - peripheral, spinal, supraspinal, etc
- Safe and effective
  - Pain management
  - Neurological conditions
  - Inflammatory disease
  - Many chronic diseases
  - In many species
- Supported by researches
- Integrate with conventional Tx
- Improve outcomes
- Promote quality of life
- Shorten hospitalizations
- Timing is the key!
- Additional tool in pocket

Integrative Medicine

Veterinary Acupuncturists
- Ronald Koh, DVM, MS, CVA, CCRP, CVCH, CVFT
- Rebecca McConnico, DVM, PhD, DACVIM, CVA
- Martha Littlefield, DVM, MS, CVA

Rehabilitation Therapists
- Ronald Koh, DVM, MS, CVA, CCRP
- Jennifer Bridges, MS, CCRP

Massage Therapist
- Mason Graham, BS, RMT/CMRT

Technician
- Stacie Dauzat, RVT