On-Demand Clinical News

The Future of Medicine: Highlights from the ProCare HospiceCare October Lunch and Learn Series

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The future of medicine can mean a lot of different things to a lot of different people depending on whom you ask. One potential avenue for the future of medicine is *digital health,* or *mHealth,* as it is commonly referred to. The term mHealth has been around for nearly as long as smartphones and it refers to the idea of mobile health—that is medical devices patients can use wherever they are, similar to how mobile phones are used. A definition of mHealth is: health care delivery via mobile health technology such as text messaging, mobile phone apps, remote monitoring, or portable sensors.

During the October Lunch and Learn we described numerous emerging technologies that might fall into the mobile health category. These can include:

- Devices
    - Devices that plug into your mobile phone
    - Devices that connect to your mobile phone via Bluetooth or Wi-Fi (ie: a wireless glucometer)
    - Devices that connect to a home health hub (commonly used when patient's don't have a mobile phone)
- Apps
    - Disease-specific apps (ie: blood glucose monitoring app for diabetes treatment)
    - Apps that accept disease-state/ biometric monitoring data (from the devices above)
    - Total healthcare apps that incorporate all of a patient's disease states and monitoring needs

There are hundreds of devices and thousands of apps being released onto the market each year in the mHealth area, and these technologies will increase the potential for patients to be monitored remotely. The devices available include blood pressure cuffs, glucose monitors, and weight scales that send their readings directly to a patient's mobile phone or to a cloud-based electronic health record.

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Managing Depression in EOL

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Depression can be a challenging condition to manage, particularly in end-of-life. A depressed mood is different from a depressive disorder. Often, patients will exhibit a depressed mood, which generally is self-limiting. A depressive disorder, which is more interfering and debilitating, usually requires long-term intervention. In end-of-life, depression may be particularly difficult to identify, because diagnostic criteria overlap with signs and symptoms that our patient population very commonly exhibits. Some of the diagnostic criteria of depression, for example, include fatigue, weight loss or gain, insomnia/hypersomnia, and/or recurrent thoughts of death. To help determine if a patient is truly experiencing depression in our patient population, look for the following additional signs/symptoms, which will usually persist over a couple weeks:

- Depressed appearance, depressed mood all the time
- Bothersome ruminations about death, impacting sleep
- Social withdrawal/disengagement
- Brooding/self-pity/pessimism
- Anhedonia (inability to experience pleasure)
- Absence of reactivity/cannot cheer up
- Helplessness/hopelessness
- Desire for hastened death
- Irritability
- Pain not responding as expected

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If treatment is warranted, non-pharmacologic therapy has the BEST evidence for efficacy (and has fewest adverse effects). CBT (Cognitive behavioral therapy), for instance, has been shown to be more effective than medications such as sertraline or duloxetine. Other non-pharmacologic options might include the use of skilled therapists, social support groups, psychotherapy and dignity therapy. Patient's total pain should be addressed and managed, as this can contribute to depression. The POOREST evidence for efficacy is with pharmacotherapy. However, if non-pharmacologic therapy options have been exhausted or are not fully effective, medications may be considered. What factors should go into the decision for anti-depressant therapy? Therapy selection should be based on expected prognosis, interacting medications, potential side effects, and patient-specific disease states.

Consider the following anti-depressant pharmacotherapies and selection criteria:

Prognosis < 4 weeks				
Medication Class	Examples	Possible Side Effects*	Typical Doses	Comments
Oral steroid	Prednisone	Insomnia, GI upset, psychosis, swelling	10-40mg/day	• Exact mechanism in mood unknown • Start lower, go slower when insomnia or agitation symptoms are present • Avoid in refractory or resistant psychosis, hallucinations, delusions • Give second daily dose prior to 2pm to avoid insomnia • Added appetite stimulation • Select dexamethasone if clinically significant edema present
	Dexametha-sone (Decadron)		2-8mg/day	
Ketamine (Ketalar)	N/A	Psychomimetic side effects (euphoria, hallucinations, vivid dreams/nightmares, delirium) more likely at higher doses and IV route; n/v; blurred vision	For depression: 0.5mg/kg PO QHS • If concerned about psychomimetic side effects: start at 0.25mg/kg and "sneak up" on therapeutic dose • Titrate dose by 10% if declining benefit	• NMDA-receptor antagonist • Blocks glutamate • May inhibit serotonin and norepinephrine reuptake • Manage psychomimetic side effects with pretreatment of 2-5mg haloperidol or 5mg diazepam PO/SL/PR. • Time to effect: hours to days • Anti-anxiety activity • Avoid in seizures, intracranial HTN, and neurologic impairment • Can give IV • Mix IV formulation with water or cherry syrup to give PO^
Stimulant	Dextroam-phetamine & amphetamine combo (Adderall)	Anxiety, transient increased BP, insomnia, dry mouth, possible visual hallucinations	2.5-20mg BID, max 40mg BID	• Increases dopamine • Time to effect: hours to days (when at therapeutic dose) • Targets sedation (including opiate-related) • Caution with anxiety, panic, cardiac disease • Start q am; if tolerated add q noon dose • Start lower, go slower when anxiety symptoms are prominent • Titrate to effect or side effect • May *increase* oral intake in EOL (but not in children and non-EOL)
	Methyl-phenadate (Ritalin)		2.5-30mg BID, max 30mg BID	

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Prognosis > 4 weeks				
Medication Class	Examples	Possible Side Effects*	Typical Doses	Comments
SSRI (selective serotonin reuptake inhibitor)	Paroxetine (Paxil)	Insomnia or sedation, GI upset, reduced libido, dizziness	10-40mg, max 50mg; may require dose adjustment in renal impairment	• If no moderate improvement by 4-8 weeks, adjust treatment; monitor ANOTHER 4-8 weeks • Latency of 2-6 weeks • 30% effective (for adults; even less in children) • Titrate to effective dose • Generally well tolerated • Start lower, go slower when anxiety symptoms are prominent • Black Box Warning – suicidal ideation • Citalopram / escitalopram: fewest CYP-450 interactions • Fluoxetine: moderately activating; 2 week half life
	Sertraline (Zoloft)		25-200mg, max 200mg; may need dose adjustment in liver impairment	
	Fluoxetine (Prozac)		10-40mg, max 80mg; requires dose adjustment in liver impairment	
	Citalopram (Celexa)		5-20mg, max 40mg (max 20mg if over age 60 or if liver impairment)	
	Escitalo-pram (Lexapro)		5-20mg, max 20mg (max 10mg/day in liver impairment)	
SNRI (serotonin norepi-nephrine reuptake inhibitor)	Duloxetine (Cymbalta)	Insomnia or sedation, GI upset, reduced libido, dizziness, headache, dry mouth, sweating	20-60mg, max 60mg/day (no more benefit at higher doses); avoid in hepatic impairment; avoid use in CrCl <30	• If no moderate improvement by 4-8 weeks, adjust treatment; monitor ANOTHER 4-8 weeks • Latency of 2-6 weeks • Beneficial for neuropathic pain • Very challenging withdrawal • Venlafaxine: very short half life • Desvenlafaxine: newer, not as much experience in children • Duloxetine: anecdotal fewer complaints of side effects, better studied for pain
	Venlafaxine (Effexor)		75-225mg, max 375mg; requires dose adjustment in renal and liver impairment	
	Desvenlafa-xine (Pristiq)		50-400mg, max 400mg; no evidence that doses >50 mg/day confer additional benefit; requires dose adjustment in renal and liver impairment	
Mirtazapine (Remeron) (mixed alpha-2, serotonin and histamine antagonist)	N/A	Sedation, dry mouth, constipation, blurred vision, weight gain, increased appetite	15-30mg, max 45mg; typically dose HS	• If no moderate improvement by 4-8 weeks, adjust treatment; monitor ANOTHER 4-8 weeks • Increases release of serotonin and norepinephrine • Works synergistically with SNRI and SSRI • *Sedating* at lower doses • *Activating* at higher doses • If sleep is disrupted, dose Q AM
DNRI (Dopamine norepineph-rine reuptake inhibitor)	Bupropion (Budeprion, Wellbutrin, Aplenzin, Forfivo)	Tachycardia, headache, agitation, insomnia, dizziness, sweating, weight loss, dry mouth, nausea, blurred vision	75-572mg/day, max dose in elderly/dementia: 300mg/day; max daily dose depends on formulation; may need dose adjustment in renal and/or liver impairment	• Not recommended in seizure D/T, arrhythmia, AV-block, bulimia • Activating: may worsen anxiety • ER (24hr): best tolerated, safest in overdose

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* Not an inclusive list; more common side effects listed; some depend on the individual agent and may not be a class effect
^ Dilute a 10 ml vial of Ketamine labeled 100mg/ml with 90 ml of diluent (water and/or cherry syrup or other such flavoring) to make 1000 mg/100 ml (or 50 mg/5 ml). Compounded ketamine oral solution have bitter taste if no flavoring used.

Remember that since SSRIs and other common antidepressants take several weeks for full effect, they also must be tapered off slowly (over several weeks) to prevent withdrawal and adverse effects. Short-acting stimulants and ketamine generally do not require a slow taper.

Consult a ProCare clinical pharmacist to avoid or manage anticipated drug interactions or side effects, recommend a starting dose, check dose adjustments for liver/renal function, or titrate up or taper off doses.

References:

1. Hirst, Jeremy. "Mental Illness at the End of Life: Improving the Practice of Interdisciplinary Team Members". NHCPO webinar online. November 13, 2014.
2. Lexi-Comp Online™ , Lexi-Drugs Online™, Hudson, Ohio: Lexi-Comp, Inc.; December 2014

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There are also wireless sensors that can be added to inhalers to calculate when and where the breathing treatment is being used. There are also home health appliances like the Bosch Health Buddy© which have been used in the hospice setting and can be helpful for monitoring chronic diseases such as CHF, Diabetes, HTN, or COPD and catching exacerbations before they become severe.

Many of these products are relatively new, and their use has been limited thus far. However with increasing use of mobile and smart phones, and access to wireless networks in various settings, their adoption is likely to continue growing.

Learn more about these connected products and other technologies that might make up the future of medicine by finding the October Lunch and Learn series: *Hospice Care in 2014 and the Application of New Technologies* on the ProCare HospiceCare website!

References:

Midlam, Cody (2014, October). Hospice Care in 2014 and the Application of New Technologies [PowerPoint Slides]. ProCare HospiceCare Lunch and Learn Series. Retrieved from http://procarehospicecare.com/educate/onlineseminar

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