(364) Medical inpatients with pain: light exposure and sleep patterns may matter

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Adults admitted to the hospital as medical inpatients (for non-surgical diagnostics and intervention) often experience pain. The lighting structure in the physical environment in which they convalesce may contribute to their discomfort by interfering with circadian rhythmicity and sleep. A predictive correlational study was done to examine the relationships among light exposure, sleep-wake patterns, and pain in medical inpatients. Light exposure and sleep-wake patterns were measured with wrist actigraph/light meters worn by participants continuously for 72 hours. Fatigue was measured by a participant's subjective answer on a Likert-type scale. Pain scores and demographics were obtained from participants' medical records. The convenience sample included 23 females, 17 males, mean age 50 years. Light exposure levels (lux): daytime M=104.8 (SD=131.1); nighttime M=7.1 (SD=7.0). Sleep (minutes): nighttime M=236.3 (SD=72.3); daytime M=161.0 (SD=81.4). Actigraph fragmentation calculations indicated highly disturbed sleep: M=9.4 epoch disturbances per 8 hours (SD=5.5). Pain scores: M=6.0/10.0 (SD=1.9). Fatigue scores: M=2.9/4.0 (SD=1.0). A significant inverse relationship was found between light exposure and fatigue ($r=-.34$, $p<.05$), and a positive relationship between fatigue and pain ($r=.34$, $p<.05$). Light exposure significantly predicted fatigue, $R2=.11$, $R2\ adj=.09$, $F(1,38)=4.86$, $p<.05$. Fatigue significantly predicted pain, $R2=.11$, $R2\ adj=.09$, $F(1,38)=4.84$, $p<.05$. The inverse relationship between light exposure and fatigue indicates that the higher the light exposure, the less fatigue even in a low light environment where participants experienced light exposure levels insufficient to support circadian entrainment. These study results provide a basis for future investigations to examine lighting interventions as a novel way to improve circadian rhythmicity, fatigue, sleep-wake patterns, and consequently pain in hospitalized adults. Supported by a grant from the American Society for Pain Management Nursing.

(365) Study of effect of slow frequency repeated transcranial magnetic field on modulation of pain in fibromyalgia patients

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Fibromyalgia is a chronic pain syndrome characterized by diffuse musculoskeletal pain, fatigue, disturbed sleep, distress and tenderness at 11 to 18 specific locations. The etiology is largely unknown but central pain processing system and neuro-hormonal axis are found to be abnormal in fibromyalgia patients. There is a lack of appropriate management of pain and associated emotional component except symptomatic relief. This experiment was conducted to assess the efficacy of low frequency repeated transcranial magnetic stimulation (rTMS) (0.5 Hz, 90% of resting motor threshold) in fibromyalgia patients. One hundred eighteen patients were randomly assigned to receive 20 sessions of sham or real repeated transcranial magnetic stimulation (rTMS) on the right dorsolateral prefrontal cortex (RDLPFC). Pre and post rTMS at wk 0, 4 and 6, pain was assessed objectively by nociceptive flexion reflex (RIII reflex) from left biceps femoris muscle; the emotional component of pain by Beck Depression Inventory second edition (BDI-II) and strategies for coping with pain by Coping Strategy Questionnaire (CSQ), while pain modulation by diffuse noxious inhibitory control (DNIC). Post-TMS (wk6), RIII threshold increased ($p<0.01$) in real rTMS groups from 27.4 ± 5.5V to 36.7 ± 5.87V indicating analgesic effect of rTMS, while it did not ($p<0.62$) change (28.6 ± 6.04V to 29.1 ± 5.5V) in sham group. The latency of RIII also increased ($p<0.045$) from 108.29 ± 34.34ms to 123.56 ± 28.41ms, post-TMS but not post-sham (112.37 ± 28.65 to 109.78 ± 30.21, $p<0.84$), while BDI-II score (12.46 ± 3.21) at wk 0 which reduced ($p<0.03$) post-TMS to 7.45 ± 1.87. The study showed that rTMS relieved pain, associated anxiety and depression suggesting it as a valuable and safe new therapeutic option for FM patients.

(366) Sublingual fentanyl: the solution to the analgesic gap in procedural pain

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Procedural pain management in burns for short, (< 30 minute) severe intensity, repeated procedures is a significant challenge. Difficulties arise around the use of fixed drug and route regimes. An audit revealed an analgesic gap whereby such procedures were poorly served by conventional methods (inhalational nitrous oxide and oxygen - Entonox, oral morphine or general anaesthesia.) A literature search to identify the optimal form of sedo-analgesia was undertaken using key words including burns procedure, procedural pain, analgesia and burn injury, from 1950 – 2011. Sublingual fentanyl was identified as the best potential intervention to bridge the analgesic gap in burns. Following approval by the hospital's New Medicines Committee and informed consent, a 19 year old male with 31% TBSA underwent a trial of sublingual fentanyl for hand therapy. The patient's therapy had failed previously with oral morphine (inadequate analgesia and prolonged post therapy sedation) and inhaled nitrous oxide: oxygen in a 50:50 mixture (loss of consciousness negating participation in the therapy). Initial sessions using 100 and 200 micrograms of sublingual fentanyl required supplemental conventional analgesia. However, 300 micrograms was adequate as sole therapy for the remaining seven sessions, without changes in vital signs or opioid side effects. A marked objective improvement in hand function, assessed using the Kapandji scale was observed. Sublingual fentanyl mirrors the nature of procedural pain, thus filling the analgesic gap. Use of sublingual fentanyl may be guided by the triage of procedures and therapies using the novel concept of the Procedural Pain Matrix. Its use is favored by its pharmacokinetic profile, familiarity, cardiovascular stability and ease of titration, with minimal side effects. It aids engagement in therapy and may reduce healthcare costs in burns. Its use in other forms of procedural pain such as skin grafting, wound debridement and dressing changes requires investigation.

(367) Progestin treatment of centralized pain

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Progestins are neuroprotective and neurogenic in the central nervous system (CNS). They are currently being investigated to treat head trauma and stroke, and animal studies suggest they may be helpful in humans who are developing or have already centralized their pain. This preliminary clinical study was done to determine if progestins maybe therapeutic in severe pain patients with centralized pain. Subjects were long-term (over 1 year) intractable pain patients who had failed standard medical treatment. All described their pain as constant, debilitating, and required daily, oral opioids at a minimal morphine equivalence of 100 mg a day for pain control. Ten (10) patients were started on MDP at a daily oral dose of 10 mg, and 22 patients were given a topical cream with 30 mg of MDP dissolved in one ounce for daily application. Patients progressively increased their oral dosage over 60 days until they reached a dosage that the patient perceived to reduce pain, require less opioid use, and cause an increase in energy, mental abilities, or libido. Six (6) of the 10 (60%) patients given oral MDP found 20 to 40 mg a day to be effective. Four reported dramatic reduction in pain and an increase in energy, mental abilities, and libido. Ten (10) of 23 (43.5%) patients who used topical MDP perceived effectiveness particularly for relief of local pain sites. MDP and other progestins warrant clinical investigation for intractable pain patients who have centralized pain. (Roof RL, et al. Gender influences outcome of brain injury: progesterone plays a protective role. Brain Res 1993, 607(1-2):333-336; Coronel MF, et al. Progesterone prevents allodynia after experimental spinal cord injury. J Pain, 2011, pp71-83.)