



Hand On Forehead: Can It Calm Our Perioperative And Critical Care Patients? A Worth Exploring Non-Pharmacological Intervention's Efficacy

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Abstract

In regards to soothing and healing hands on our foreheads, we as medical scientists have begun to wonder and question whether human touch soothes and how maternal touch heals. Thus, we as anesthesiologists and perioperative physicians and critical care specialists have envisaged a protocol which can be used to seek the proof in colloquial terms and the evidence in scientific terms whether the age-old human touch with its caring maternal innuendos needs to prove itself to be acceptable as a comforting and may be a healing strategy in perioperative scenarios and in critical care settings. Essentially, results can be expected from the envisaged protocol to deduce that instead of asking whether the benefits of skin-to-skin contact are lost once humans outgrow their infancy, it is important to recognize that, as time passes by, the knowledge of these benefits may be getting lost instead of the benefits themselves getting lost. Therefore, there may not be a better way than the calming caring cooler hands pressed on the foreheads of agitated/combatative perioperative and critically ill patients to scientifically explore calming and may be healing power of human touch.

Origin of Hypothesis

As children we have always been pacified [1] and comforted by our elders's hands over heads [2-5] and especially our mothers' hands on our foreheads. There is never a time that comes to our memories when our mothers' hands on our foreheads did not calm us down whether we were crying or agitating or nauseating or vomiting. But as we grew older, we got/became lost and forgot the importance of human touch [6-13], especially caring maternal touch because we as medical scientists began to wonder and question how come human touch soothes and why so maternal touch heals. Do we have proof? Are the questions reliable? Are the results reproducible? Will evidence be valid? Essentially, we as anesthesiologists and perioperative

physicians and critical care specialists have envisaged the hereafter presented protocol which can be used to seek the proof in colloquial terms and the evidence in scientific terms whether the age-old human touch with its caring maternal innuendos needs to prove itself to be acceptable as a comforting and may be a healing strategy in perioperative scenarios and in critical care settings. Â

Envisaged Materials and Methods

After institutional review board approval for waived patient consent from patients aged 18 years or more, waived parental consent from parents of wards aged less than 18 years and waived oral assent from patients aged 7 years and less than 18 years, all patients presenting to the perioperative and critical care settings can be included in this randomized controlled prospective study. In case if mastering the intervention of hand on forehead is turning out to be difficult, then patients aged less than 7 years can be excluded from inclusion into this study considering that the head size of such pediatric patients may be too small and the hand pressure on their foreheads may unintentionally become too high. The difficulty in mastering the intervention can be the simple fact that the hand pressure over forehead must not restrict patient's head movement wherein it will have to be envisaged how much pressure on the forehead of an adult or a child or a young one is not being perceived by the adult or the child or the young one as if being held down forcefully. As the objective amounts of hand pressure on forehead for various age groups are still unknown and non-quantified, the efficacy and safety of subjective mastering of this non-pharmacological intervention is an uncharted domain yet. However, instead of constant hand-force pressing the forehead, hand-pressure being released every few moments intermittently and rhythmically may make this intervention's perception as a supportive hand-hold instead of forceful hold-down. The envisaged intervention has been schematically shown in Figure 1.

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For now, the envisaged investigation can be limited to tabulated avenues only which can be further expanded if the results appear promising on the expected lines. Therefore, for now, the patients demonstrating any of the tabulated six symptoms can be correspondingly randomized into three groups and thus there can be patients distributed into eighteen groups with 30 patients in each group (total 540 patients; see Table 1). Simple scoring can be modified from Richmond Agitation-Sedation Scale (RASS) [14] wherein patients can be scored at the start of 10-minute period and at the end of 10-minute period by the abbreviated newly-envisaged-and-named *CRAC* score:

- Calm with absent non-purposeful movements
- Restless with infrequent non-purposeful movements, controllable by patient
- Agitated with frequent non-purposeful movements, controllable by caregiver
- Combative with aggressive non-purposeful movements, uncontrollable by caregiver

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This non-pharmaceutical intervention may most likely be utilized when patients are Agitated or Combative because utilizing this technique may not produce appreciable differences and reproducible results when patients are just Restless. Moreover, when utilizing this non-pharmaceutical intervention, it is automatically implied that none of the study patients can be scored as Calm at the start of 10-minute period. Similarly, presuming that almost all study patients may become Calm at the end of 10-minute period, it may be better, for comparative analysis among groups, to record the time when the patients first become Calm during the 10-minute period. In terms of migraines, seizures and panic attacks, their comparative incidence among the three types of interventions can be recorded for analysis. Additionally, the following standardized rescue medications can be used as corresponding to the row in Table 1 for comparison among the three types of interventions accordingly:

- In perioperative seizure aura patients, comparison of anti-seizure rescue medication as midazolam's dose given during 10-minute period.
- In perioperative migraine aura patients, comparison of headache rescue medication as fentanyl's dose given during 10-minute period.
- In preoperative severe anxiety patients, comparison of anti-anxiety rescue medication as midazolam's dose given during 10-minute period.
- In intraoperative anxiety Cesarean section patients, comparison of rescue medications' doses may not be done because anti-anxiety medications may have to be avoided to prevent their placental transfer to fetuses

- In emergence agitation patients, comparison of anti-agitation rescue medication as dexmedetomidine's dose given during 10-minute period.
- In ICU delirium patients, comparison of anti-delirium rescue medication as dexmedetomidine's dose given during 10-minute period.

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Besides the above-mentioned, standard baseline demographics can be recorded like patients' age, sex, height and weight, and body mass index. Patients' co-morbidities can be recorded but, considering the absence of any exclusion criteria for this waived consent randomized controlled prospective study, they may not serve towards being analyzable as confounding factors especially when the intervention is simple non-pharmacological placement of hand on forehead for 10-minute period or less.

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Statistical analysis

The primary outcome can be difference in proportions of calmed patients after 10-minute interventions with either non-gloved hands or gloved hands as compared to after 10-minute interventions with non-pressing non-touching hands over the foreheads of agitated or combative patients. The secondary outcome can be (a) difference in doses of rescue medications for calming agitated or combative patients during 10-minute interventions with either non-gloved hands or gloved hands as compared to during 10-minute interventions with non-pressing non-touching hands over their foreheads, and (b) difference in time to achieve Calm state in Agitated or Combative patients during 10-minute interventions with either non-gloved hands or gloved hands as compared to during 10-minute interventions with non-pressing non-touching hands over their foreheads. The supplementary outcomes can be differences for the above-mentioned primary and secondary outcomes even between the patients receiving 10-minute interventions with non-gloved hands and the patients receiving 10-minute interventions with gloved hands. The proportions can be compared by Chi square analysis while means can be compared by analysis of variance (ANOVA). The statistical significance level can be ascertained to have been achieved when analyzed $p < 0.05$.

Expected Line of Results

Assuming that hand on forehead has calming effect, the expected line of results can be (a) significantly increased proportions of calmed patients after

10-minute interventions with either non-gloved hands or gloved hands as compared to after 10-minute interventions with non-pressing non-touching hands over the foreheads of agitated or combative patients, (b) significantly decreased doses of rescue medications for calming agitated or combative patients during 10-minute interventions with either non-gloved hands or gloved hands as compared to during 10-minute interventions with non-pressing non-touching hands over their foreheads, (c) significantly decreased time to achieve Calm state in Agitated or Combative patients during 10-minute interventions with either non-gloved hands or gloved hands as compared to during 10-minute interventions with non-pressing non-touching hands over their foreheads, and (d) significant differences for the above-mentioned primary and secondary outcomes even when the patients receiving 10-minute interventions with non-gloved hands are compared with the patients receiving 10-minute interventions with gloved hands.

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The explanation may be simply that the hand pressure on forehead may be breaking the feedback loop to the brain wherein the hand pressure on forehead by physically relieving or preventing the creation of "cardiovascular mortality risk-signaling and risk-enhancing forehead wrinkles" [15-17] may be "misleading" brain to assume that "everything must be alright" considering there are no wrinkles on forehead [2]. Moreover, assuming that compared to gloved hands, non-gloved hands can be considered as transgressions when healthcare workers examine patients' anatomically "private" areas [18-19], it ironically signifies that human skin's touch has a different feedback loop in the touched person's brain as compared to when gloves are interfering with skin-to-skin touch by being a plastic barrier between the two skins [20]. Therefore, it may be worthwhile to not only explore if there is calming effect with hand on forehead but also going further to explore if the calming effect is enhanced by non-gloved hand "pressing and touching" on forehead as compared to gloved hand "only pressing" on forehead. Essentially, the focus may be to decipher if the feedback loop to brain secondary to appropriate gloved hand pressure on forehead is accentuated by the feedback loop to brain secondary to warm non-gloved hand touch on forehead. It can be further explored in futuristic times to confirm that it is not a pressure band on forehead but rather a caring hand on forehead when futuristically invented robotic hands with futuristically

designed electronic skins [21] are designated to work long hours for pressing and touching foreheads of critically ill patients demonstrating ICU delirium so as to abort-or-shorten their cycles of agitations. These robotic hands with temperature-controlled electronic skins and pressure-controlled self-inflating cushions may have to decipher over time which temperature range and which pressure range may serve best for calming the agitated and delirious patients in ICUs. Only time may tell if the potential physiology behind the calming effect of "hand on forehead" may be "much more beyond than just the light pressure on the forehead muscles or the light touch of human skin-on-skin because the human skin-to-skin touch may be actually allowing "heat transfer" from agitated/combative patients' warmer foreheads into the cooler calming hands on their foreheads. It may be further interesting to explore if healthcare workers' hands on foreheads behave differently than caregivers' (kin's) hands on foreheads [18] in regarding to breaking the cycles of agitation and combativeness, considering that there may be clinical instances when kin's may be there to help with their hands on patients' foreheads (a) during emergence agitation in pediatric patients recovering in post-anesthesia care units or (b) while acting as support persons for patients during their cesarean sections under awake regional anesthesia or (c) while acting as caregivers during critically ill patients' stay in ICUs.

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Summarily, instead of asking whether the benefits of skin-to-skin contact are lost once humans outgrow their infancy, it is important to recognize that, as time passes by, the knowledge of these benefits may be getting lost instead of the benefits themselves getting lost. Therefore, there may not be a better way than the calming caring cooler hands pressed on the foreheads of agitated/combative perioperative and critically ill patients to scientifically explore the calming and may be the healing power of human touch.

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Table 1

Table 1: Envisaged Distribution of 540 Patients into Eighteen Groups

Å	10-minute Intervention With Non-Gloved Hand (Pressure plus Touch)	10-minute Intervention With Gloved Hand (Pressure Only)	10-minute Intervention With Non-Pressing Non-Touching Hand (Control)
Perioperative Aura For Seizure	30 patients	30 patients	30 patients
Perioperative Aura For Migraine	30 patients	30 patients	30 patients
Preoperative Severe Anxiety or Panic Attack	30 patients	30 patients	30 patients
Intraoperative Anxiety In Post-Regional Anesthesia Awake Cesarean Section Patients	30 Females only	30 Females only	30 Females only
Emergence Agitation	30 Minors only	30 Minors only	30 Minors only
Intensive Care Unit (ICU) Delirium	30 Adults only	30 Adults only	30 Adults only

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Figure 1

Figure 1: Schematic Diagram Showing Hand on Forehead

