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Original Research Article

Effect of acupuncture at the EX-HN3 (Yintang) point on pre operative anxiety levels in patients undergoing surgery under general anaesthesia

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ABSTRACT

Introduction: Pre-operative anxiety is unpleasant state of psychological distress, uneasiness or tension. Increased pre-operative anxiety has correlation with increased post-operative pain, analgesic requirement and prolonged hospitalisation. Due to the associated side effects with pharmacological methods many non-pharmacological methods have been adopted. Acupuncture lacks side effects and is of relatively low cost. Hence we assess the pre-operative anxiety levels in patients undergoing surgical procedures by using acupuncture at EX-HN3 (Yintang) point.

Aim: To assess the effect of acupuncture on pre-operative anxiety levels in patients undergoing surgery under general anaesthesia.

Materials and Methods: A total of 240 patients undergoing surgery under general anaesthesia will be included in the study. Patients will be randomized in to two groups. Group A: Patients receiving acupuncture at EX-HN3 (Yintang) point. Group B: Patients not receiving acupuncture. At the pre-operative visit, on the day of surgery before and after acupuncture therapy, the patient will be assessed for anxiety scores using.

Results: The two groups were comparable demographically. Pre-operative anxiety levels as assessed by objective criteria (HR, BP, RR) shown significant reduction in intervention group ($P < 0.001$) compared to the control group ($P = 0.0556$). The scores on STAI-S6 and Amsterdam scale were reduced in acupuncture Group A ($P < 0.001$) ($P < 0.001$) compared to control Group B ($P = 0.47$) ($P = 0.0095$) respectively.

Conclusion: Acupuncture at EX-HN3 (Yintang) point decreases pre operative anxiety levels effectively in patient undergoing surgery under general anaesthesia.

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1. Introduction

Pre-operative anxiety is defined as a “persistent feeling of dread, apprehension, unpleasant state of psychological distress or tension and uneasiness”.¹ Anxiety before undergoing surgery is experienced by approximately 60–70% of adult patients.^{2,3} Sympathetic and parasympathetic nervous system, stimulated by preoperative anxiety results in tachycardia, hypertension and cardiac adverse events like arrhythmias. It also

stimulates endocrine system, there by 40% increase in plasma adrenaline level and electrolyte imbalance leading to negative consequences during intra operative and postoperative periods.⁴ Preoperative anxiety is associated with increased postoperative pain, drug requirement, post operative nausea and vomiting and duration of hospital stay.⁵

Different techniques used to relieve it have gained considerable attention. The traditional approach to reduce preoperative anxiety includes pharmacological anxiolysis with opioids, benzodiazepines, barbiturates, neuronal Kv7 channels stimulants like Flupirtine etc.^{6,7} Due to the

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limitations such as overuse, side-effects, tolerance and dependence of conventional pharmacotherapy, the non pharmacological methods like behavioral interventions such as patient counseling, distraction, attention focusing, psychological interventions, music, audiovisual intervention, yoga and relaxation procedures are adopted.^{8,9} Acupuncture is an effective non pharmacological tool and its efficacy and safety for treating various mental and physical disorders have been studied. Hence in an attempt to reduce pre-operative anxiety without having any side effects, this study was performed to assess the influence on pre-operative anxiety levels in patients undergoing surgical procedures by using acupuncture at EX-HN3 (Yintang) point.

2. Aims and objectives

To assess "effect of acupuncture on pre-operative anxiety levels in patients undergoing surgery under general anaesthesia".

3. Materials and Methods

3.1. Randomized clinical trial

Patients aged 18-50 years, of either gender, belonging to ASA grade I and II, undergoing elective surgery under general anaesthesia at "KLE's Dr. Prabhakar Kore Hospital and Medical Research Centre, Nehru Nagar, Belagavi" 590010, between January 2018 to December 2018.

3.2. Sample size formula

The sample size formula is based on "mean and standard deviation" (SD).

$$n = n = \frac{(z_{\alpha} + z_{\beta})^2 (s_1^2 + s_2^2)}{(\bar{X}_1 - \bar{X}_2)^2}$$

Where z_{α} is linked with the level of significance and z_{β} is linked with the power of the test. For 5% level of the significance $z_{\alpha} = 1.96$ and $z_{\beta} = 0.84$ for 80% power of the test. \bar{X}_1 is the mean of the first group (91.70).

\bar{X}_1 is the standard deviation of the first group (8.20) and \bar{X}_2 is the standard deviation of the second group (7.42).⁴

With these values the sample size obtained is 240.

After obtaining ethical committee approval and written informed consent, a total of number of 240 patients undergoing surgery under general anaesthesia were considered for the study. After having met inclusion and exclusion criteria and having obtained informed consent, patients were randomized based on computer generated randomization table in to two groups.

Group A: (120 Patients) Patients who received acupuncture at EX-HN3 (Yintang) point.

Group B: (120 Patients) Patients who did not receive acupuncture.

At the pre-operative visit, the patient will be assessed for the pre-operative anxiety scores by using

3.3. Objective criteria

Which includes heart rate, blood pressure, respiratory rate.

3.4. Subjective criteria

Using a self evaluation questionnaire. They are, A. "Shortened 6 items state trait anxiety inventory (STAI-S6)". B. "Amsterdam pre-operative anxiety and information scale".

3.5. Shortened six items state trait anxiety inventory (STAI-S6) questionnaire

Each answer was awarded particular score which were added up, giving a aggregate score of 6-24. The final score was divided by 6 (total items) and multiplied with 20 to get an appropriate score between 20 and 80 for the need of comparison. (Table 2)

3.6. Amsterdam pre-operative anxiety and information scale

The response of patients to the questionnaire was assessed by five point Likert Scale, 1 representing "Not at all" and 5 as "Extremely". Questions 1,2,4 and 5 of the questionnaire contained anxiety elements and scores of which were added up giving a aggregate score of 4-20.

1. I am worried about the anesthetic.
2. The anesthetic is on my mind continually.
3. I would like to know as much as possible about the anesthetic.
4. I am worried about procedure.
5. The procedure on my mind continually.
6. I would like to know as much as possible about the procedure.

The patients were retained in the pre-operative room for 40 minutes on the day of surgery and the patients in group A i.e, those receiving acupuncture therapy received acupuncture in single session that consisted of insertion of press-stud needle (0.2mm x1.5mm JIAVIAN) (Figure 1) at EX-HN3 (Yintang) point (Figure 2) and instructed to stimulate the needle manually in a small circular fashion every 10 minutes by applying a pressure to the press study. The needle was left insitu and after 30 minutes it was removed, where as the patients in a group B were retained in the pre-operative area for 30 minutes and left undisturbed, at the end of 30 minutes the patients in the both groups were asked to complete both questionnaires and vitals were recorded (HR, BP, RR).

3.7. Statistical methods

Student unpaired 't' test is used to calculate the significance of study in Inter group and for intra group analysis students paired 't' test is used.



Fig. 1: Acupuncture needles



Fig. 2: Location of the EX-HN3 (YINTANG) point

3.8. Statistical software

The statistical software namely SPSS 20.0, was used for the analysis of the data and to generate graphs and tables etc Microsoft word and Microsoft Excel have been used.

Table 1: Inclusion and exclusion criteria

Inclusion criteria	Exclusion criteria
ASA status I and II.	Patients requiring rapid sequence intubation.
Age between 18 to 50 years.	Contraindication to acupuncture.
Elective surgeries under general Anaesthesia.	Psychiatric patients.
Provides Consent.	History of previous acupuncture therapy.
Literate and able to understand pre-operative questionnaire.	Planned use of acupuncture for post operative nausea and vomiting.

4. Results

In total 240 patients recruited to the study were analysed for the primary outcome (Figure 4). The groups were comparable with respect to age, sex, weight and ASA status (Table 3).

At 30 minutes after acupuncture therapy, pre operative anxiety levels as assessed by objective criteria (HR, BP, RR) shown significant reduction in intervention group (Group A) ($P < 0.001$) compared to the control group (Group B) ($P = 0.0556$) (Table 4). In concern to subjective criteria we observed STAI-S6 (Figure 4) and Amsterdam scale (Figure 5) to be decreased in acupuncture Group A ($P < 0.001$) ($P < 0.001$) compared to control Group B ($P = 0.47$) ($P = 0.0095$) respectively.

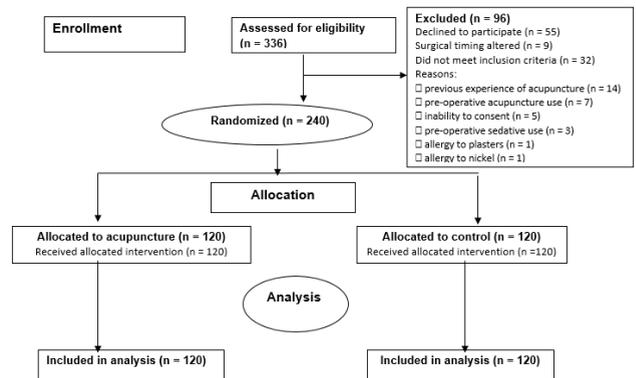


Fig. 3: CONSORT flow diagram

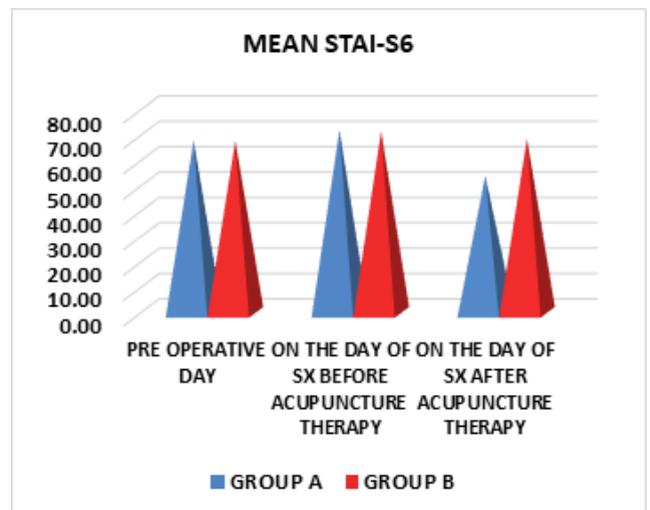


Fig. 4: Showing mean Shortened 6 items state trait anxiety inventory

No adverse events were reported in any subjects who received acupuncture therapy.

Table 2: Shortened six items state trait anxiety inventory (STAI-S6) questionnaire

	Not at all	Some what	Moderately	Very much
I feel calm	4	3	2	1
I feel tense	1	2	3	4
I feel upset	1	2	3	4
I feel relaxed	4	3	2	1
I feel content	4	3	2	1
I feel worried	1	2	3	4

Table 3: Demographical data. values shown are mean (Standard deviation)

Parameters	Acupuncture Group n=120	Control Group n=120
Weight (Kg)*	59.81 (9.15)	60.12 (8.97)
Height (cm)	160.00 (5.57)	159.63 (5.48)
Sex (M/F)	52/68	59/61
ASA status (I/II)	84/36	79/41

Table 4: Objective criteria

Parameters		PR* (bpm) Mean (SD)	BP (mmHg) SBP/DBP Mean (SD)	RR (cpm) Mean (SD)
Pre-operative day	Group A	82.47 (5.23)	131.15 (9.97) 82.48 (6.24)	12.86 (0.65)
	Group B	82.90 (5.59)	131.57 (10.19) 81.17 (6.91)	12.86 (0.85)
	p value	0.5359	0.7490 0.1225	1.0000
On the day of surgery before acupuncture therapy	Group A	85.57 (5.93)	134.92 (9.89) 83.77 (7.22)	12.60 (0.70)
	Group B	86.34 (6.24)	134.57 (9.92) 81.20 (6.15)	12.57 (0.62)
	p value	0.3248	0.7846 0.0033	0.6968
On the day of surgery after acupuncture therapy	Group A	73.18 (6.41)	121.78 (10.27) 74.65 (6.76)	11.46 (0.74)
	Group B	82.83 (6.43)	131.48 (9.91) 80.42 (6.34)	12.32 (0.73)
	p value	0.0000	0.0000 0.0000	0.0000

5. Discussion

Pre operative anxiety is the subjective emotional state characterised by feeling of fear over something unlikely to happen as a feeling of death. The incidence of pre-operative anxiety in adults varies from 11% to 80% in different surgical groups.^{10,11}

Anaesthetic concerns associated with pre-operative anxiety on induction of anaesthesia correlates with increased time for the jaw relaxation, higher incidence of coughing, postoperative pain, increase in analgesic and anaesthetic requirements, delayed recovery and discharge from hospital. In addition, anxiety may adversely affect recovery and decreases patient's satisfaction with peri-operative experience.^{12,13}

The etiology of preoperative anxiety is multifactorial, they are divided as¹⁴⁻¹⁷

1. Common anxiety provoking agents
2. Specific anxiety provoking agents

Many pharmacological and non-pharmacological methods have been adopted to reduce the pre-operative anxiety. The most commonly used pharmacological agents being opioids and benzodiazepines. Opioids are only moderately effective in alleviating pre-operative anxiety and often produce side effects like "bradycardia, hypotension, pruritis, respiratory depression and post-operative nausea and vomiting". Whereas benzodiazepines are associated with side effects like drowsiness, delayed emergence, there by prolonging patient's recovery and treatment

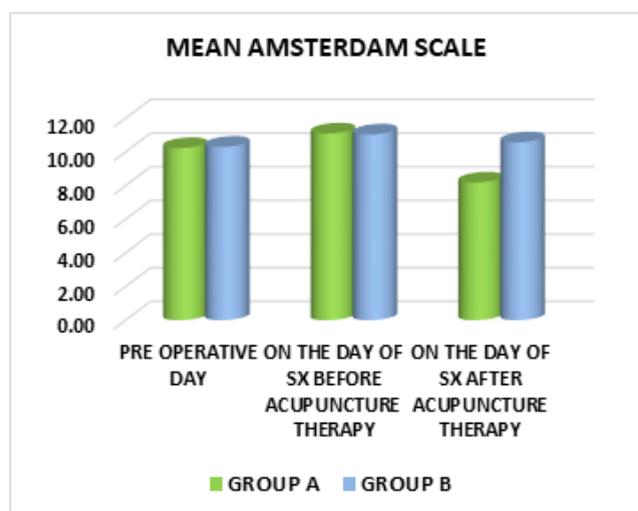


Fig. 5: Showing mean Amsterdam scale

duration.¹⁸ Acupuncture, a non pharmacological technique to relieve anxiety is beneficial to patient as it lacks side effects and is of relatively low cost. Acupuncture gaining popularity in western medical practice as a tool for pain relief. Acupuncture has been investigated as a non-pharmacological method for reduction of anxiety.^{19–21}

Acupuncture is the ancient Chinese science, on which various studies have been made. Most studies have shown that EX-HN3 (Yintang) point can be identified easily, be stimulated using a needle sticker or needle and is effective in reducing anxiety.

STAI-S6 and Amsterdam scale considered to be gold standard for assessing pre-operative anxiety, because it has the advantage of being simple questionnaire. Jaime Ortiz et.al assessed pre-operative anxiety by questionnaires concerned to age, sex, education status, primary language and patients satisfaction with concern to knowledge regarding anaesthesia and surgery.⁶ Hence a single questionnaire was used for our study group.

Our study has shown that 30 minutes of acupuncture at EX-HN3 point resulted in reduction in pre-operative anxiety levels as measured by objective criteria (HR, BP,RR) and subjective criteria(STAI-S6 and Amsterdam Scale) in patients undergoing surgery under General Anaesthesia. Pre operative anxiety levels as assessed by objective criteria (HR, BP, RR) have shown significant reduction in intervention group ($P < 0.001$) compared to the control group ($P = 0.0556$) which were similar to Huang and Tang (2009) who performed acupressure at EX-HN3 in Group A ($n = 40$) and did not perform any intervention in Group B ($n = 40$) and found heart rate (HR), systolic blood pressure (SBP), and diastolic blood pressure (DBP) at post intervention in the Group A ($P < 0.01$) were all significantly lower compared to Group B ($P < 0.05$).³

In concern to subjective criteria we observed STAI-S6 and Amsterdam scale, to be decreased in acupuncture

Group A ($P < 0.001$) ($P < 0.001$) compared to control Group B ($P = 0.47$) ($P = 0.0095$) respectively. These results are similar to the Wiles et al. (2017) who performed acupuncture using an acupuncture sticker on EX-HN 3 in Group A ($n = 62$) and did not perform any intervention in a Group B ($n = 62$) and found lower STAI-S6 and Amsterdam scale in Group A ($P < 0.001$; $P < 0.001$) compared to Group B ($P = 0.829$; $P = 0.872$) respectively. Acar et al. (2013) performed acupuncture using an acupuncture sticker on EX-HN3 in an Group A ($n = 26$) and sham acupuncture on a non-acupoint in a Group B ($n = 26$). The anxiety score measured by the STAI-S, and anxiety level were lower in Group A ($P = 0.018$) compared to Group B ($P = 0.387$).²²

Exact mechanism of acupuncture by which it is exerting anxiolytic effect has to be determined. Decreased activity in amygdala and hypothalamus shown by functional MRI imaging.²³ This is either due to direct “central sedative effect or sympatholysis effect”.

Limitations of our study, the patients were not followed up postoperatively. Anxiety causes activation of sympathetic nervous system leading to increase in plasma catecholamine. In our study we didn’t measure plasma catecholamine before and after initiation of acupuncture therapy, future studies can be conducted to correlate the plasma catecholamine levels with acupuncture session.

6. Conclusion

Acupuncture decreases “pre operative anxiety levels effectively in patient undergoing surgery under general anaesthesia”.

7. Source of Funding

None.

8. Conflict of Interest

The author declares no conflict of interest.

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