**PRISMA-P (Preferred Reporting Items for Systematic review and Meta-Analysis Protocols) 2015 checklist: recommended items to address in a systematic review protocol\***

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| Section and topic | Item No | Checklist item | Page No |
| ADMINISTRATIVE INFORMATION |  |
| Title:  |  | **Auricular acupuncture for preoperative anxiety - protocol of systematic review and meta-analysis of randomized controlled clinical trials** |  |
|  Identification | 1a | This is a protocol of a systematic reviewTitle | Page 1 |
|  Update | 1b | There is no previous review on this topic   | 2, 10 |
| Registration | 2 | PROSPERO ID CRD42020184795 | 2 |
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|  Contributions | 3b | Data collection: Joanna Dietzel, Taras UsichenkoFunding acquisition: Klaus Hahnenkamp, Benno BrinkhausFormal analysis: Mike CummingsSupervision: Mike Cummings, Klaus HahnenkampWriting – original draft: Joanna Dietzel, Taras Usichenko, Benno BrinkhausWriting – review & editing: Joanna Dietzel, Taras Usichenko, Mike Cummings | 11 |
| Amendments | 4 | Not applicable |  |
| Support: |  |  |  |
|  Sources | 5a | Joanna Dietzel received a research grant from the Karl and Veronica Carstens foundation for conducting several clinical studies and a systematic review with Meta-Analysis.  | 12 |
|  Sponsor | 5b | Karl and Veronica Carstens foundation, Am Deimelsberg 36, 45276 Essen, Germany.  |  |
|  Role of sponsor or funder | 5c | The foundation had no role in the development of the protocol. |  |
| INTRODUCTION |  |
| Rationale | 6 | Preoperative anxiety causes a profound psychological and physiological reactions, that may lead to a worse postoperative recovery, higher intensity of acute and persistent postsurgical pain and impaired quality of life in the postoperative period. Previous randomized controlled trials (RCTs) suggest that auricular acupuncture (AA) is safe and effective in treatment of preoperative anxiety; a systematic evidence on this topic is missing. The results of this review will provide the basis for better understanding of auricular acupuncture in treatment of perioperative anxiety and will yield the evidence for implementation of this method in clinical practice. | 4, 11 |
| Objectives | 7 | Types of participants No restrictions on study populations will be made, as long as they are described as patients, undergoing surgical procedures, including all medical interventions requiring intra-procedural sedation or analgesia. There will be no restrictions regarding the age, gender or ethnicity of participants.Types of interventions/comparatorsThis review will include all studies, where auricular stimulation or related interventions (auricular acupuncture, auricular acupressure, auricular electroacupuncture, etc.) applied alone or in addition to routine care will be compared with a variety of control conditions, such as: sham acupuncture, acupressure, placebo, routine care, various cognitive-behavioral therapies (CBTs) such as relaxation techniques, music therapy, hypnosis, etc.Types of outcome measuresPrimary outcomesThe primary outcome for this review will be an intensity of preoperative anxiety, measured using patient-reported psychophysical anxiety scales, such as the State Trait Anxiety Inventory (STAI), Anxiety Visual Analogue Scale-100 (VAS-100), the Amsterdam Preoperative Anxiety and Information Scale (APAIS), Self-Rating Anxiety Scale (SAS), extensively described elsewhere (23). Secondary outcomesSecondary outcomes will include physiological parameters describing the response of the autonomic nervous system (e.g. heart rate, blood pressure, respiratory rate, sweating reaction); the preoperative requirement of anxiolytic medication; the intraoperative requirement of anaesthetic and analgesic medication; the intensity of postoperative pain; the postoperative requirement for analgesic medication and patient satisfaction with the treatment of preoperative anxiety.Safety of intervention. Adverse event and serious adverse events reporting will be analysed, including events such as pain, inflammation and infection at the sites of auricular stimulation, and vasovagal reactions during the auricular interventions. | 5, 6 |
| METHODS |  |
| Eligibility criteria | 8 | Only randomized controlled trials (RCTs) in European languages will be included. Results from quasi RCT will be discussed if little evidence is available, but they will not be part of the analysis.Types of participants No restrictions on study populations will be made, as long as they are described as patients, undergoing surgical procedures, including all medical interventions requiring intra-procedural sedation or analgesia. There will be no restrictions regarding the age, gender or ethnicity of participants.Types of interventions/comparatorsThis review will include all studies, where auricular stimulation or related interventions (auricular acupuncture, auricular acupressure, auricular electroacupuncture, etc.) applied alone or in addition to routine care will be compared with a variety of control conditions, such as: sham acupuncture, acupressure, placebo, routine care, various cognitive-behavioral therapies (CBTs) such as relaxation techniques, music therapy, hypnosis, etc.Types of outcome measuresPrimary outcomesThe primary outcome for this review will be an intensity of preoperative anxiety, measured using patient-reported psychophysical anxiety scales, such as the State Trait Anxiety Inventory (STAI), Anxiety Visual Analogue Scale-100 (VAS-100), the Amsterdam Preoperative Anxiety and Information Scale (APAIS), Self-Rating Anxiety Scale (SAS), extensively described elsewhere (23). Secondary outcomesSecondary outcomes will include physiological parameters describing the response of the autonomic nervous system (e.g. heart rate, blood pressure, respiratory rate, sweating reaction); the preoperative requirement of anxiolytic medication; the intraoperative requirement of anaesthetic and analgesic medication; the intensity of postoperative pain; the postoperative requirement for analgesic medication and patient satisfaction with the treatment of preoperative anxiety.Safety of intervention. Adverse event and serious adverse events reporting will be analysed, including events such as pain, inflammation and infection at the sites of auricular stimulation, and vasovagal reactions during the auricular interventions. | 5, 6 |
| Information sources | 9 | The search will be done across the following electronic databases and registers, from their inception till June 2020: MEDLINE (PubMed), EMBASE, Cochrane Central Register of Controlled Trials (CENTRAL), ISI Web of Science, Scopus Database, Google search. | 7 |
| Search strategy | 10 | Table 1. Search strategy used in MEDLINE databaseN Search item [title/ abstract]1 Randomized controlled trial2 Controlled clinical trial3 Randomized4 Randomly5 Trial6 OR #1-67 Anxiety8 Fear9 Preoperative11 Surgical12 Intervention14 Anesthesia15 OR #7-1416 Auricular acupuncture17 Auricular 18 Ear 19 Acupressure20 Electro-acupuncture21 OR #16-20This search strategy will be modified as required for other electronic databases. | Table 1, table 2 |
| Study records: |  |  |  |
|  Data management | 11a | A new database for each of the two researchers will be set up to organize the data of the literature search.  | 7, table 2 |
|  Selection process | 11b | Two researchers will screen the titles and abstracts of articles found in the search, and discard trials that are not eligible. They will assess independently whether the trials meet the inclusion criteria, with disagreements to be resolved by discussion with the third author. When articles contain insufficient information to make a decision about eligibility, one of the researchers will attempt to contact authors of the original reports to obtain further details via email. |  |
|  Data collection process | 11c | Following the selection for inclusion, two researchers will independently extract data according to the standardized form designed by the review group. A third researcher will check for accuracy and enter data into Review Manager software (RevMan 5.3. 2011). |  |
| Data items | 12 | For variables for which data will be sought please see our PICO items. Funding sources will be registered. |  |
| Outcomes and prioritization | 13 | **Primary outcomes**State Trait Anxiety Inventory (STAI)Anxiety Visual Analogue Scale-100 (VAS-100)Amsterdam Preoperative Anxiety and Information Scale (APAIS)Self-Rating Anxiety Scale (SAS)**Secondary outcomes**physiological parameters describing the response of the autonomic nervous system heart rateblood pressurerespiratory ratesweating reactionpreoperative requirement of anxiolytic medicationintraoperative requirement of anaesthetic and analgesic medication the intensity of postoperative pain; the postoperative requirement for analgesic medication and patient satisfaction with the treatment of preoperative anxiety.List and define all outcomes for which data will be sought, including prioritization of main and additional outcomes, with rationale | Table 2 |
| Risk of bias in individual studies | 14 | Assessment of risk of bias in included studiesTwo researchers will assess all included trials for risk of bias, blind to each other's assessments. Random sequence generation, allocation concealment, blinding of participants and personnel, incomplete outcome data, selective reporting and other potential sources of bias will be evaluated regarding low, high and unclear risk of bias according to Cochrane Collaboration assessment tool. Any disagreements will be resolved by discussion or by involving a third researcher to adjudicate.Measures of treatment effectsSince all outcome measures of this review represent continuous data, they will be presented as mean differences with 95% confidence intervals (CI), or as standardized mean differences (SMD).Dealing with missing data.All outcomes will be analyzed on an intention-to-treat basis. Corresponding authors from the trials with incomplete or insufficient data will be contacted via email to complete the data. Trials with greater than 20% of missing data will be excluded from the analysis.Assessment of heterogeneityStatistical heterogeneity will be assessed in each meta-analysis using the T2, I2 and Chi2 statistics calculated by RevMan software. Heterogeneity will be regarded as substantial if T2 is greater than zero and either I2 is greater than 50% or there is a low P value (less than 0.10) in the Chi2 test for heterogeneity.Assessment of reporting biasesIf the meta-analysis includes more than 10 investigations, reporting biases will be studied using a funnel plot with asymmetry testing. Statistical analysis will be carried out using the RevMan software. Fixed-effect meta-analysis for combining data including primary outcome (anxiety scales) will be performed to estimate the treatment effect using SMD and 95% CI. In case of substantial clinical or statistical heterogeneity, a random-effects (RE) meta-analysis will be done to yield an overall summary. If RE analyses will be necessary, their results will be presented as the average treatment effect with its 95% confidence interval, and the estimates of T2 and I2. | 8,9 |
| Data synthesis | 15a | Since all outcome measures of this review represent continuous data, they will be presented as mean differences with 95% confidence intervals (CI), or as standardized mean differences (SMD).  | 9, 10 |
| 15b | Statistical heterogeneity will be assessed in each meta-analysis using the T2, I2 and Chi2 statistics calculated by RevMan software. Heterogeneity will be regarded as substantial if T2 is greater than zero and either I2 is greater than 50% or there is a low P value (less than 0.10) in the Chi2 test for heterogeneity. |  |
| 15c | Subgroup analysis and investigation of heterogeneity To assess potential heterogeneity, subgroup analyses will be performed including following comparisons: adult versus pediatric patients; female versus male patients; emergency surgery versus elective surgery; inpatient versus outpatient surgery. Differences between subgroups will be assessed by interaction tests for fixed-effect inverse variance meta-analyses. For fixed-effect meta-analyses and RE using methods other than inverse variance, the comparison of subgroups’ confidence intervals will be used: non-overlapping confidence intervals indicate a statistically significant difference in treatment effect between the subgroups.Sensitivity analysisWhere subgroup analysis fails to explain the heterogeneity, data analysis using the RE model will be used. A priori, sensitivity analyses on results will be done to look at the possible contribution of differences in methodological quality, comparing trials with a low risk of bias to all trials. |  |
| 15d | In case of substantial clinical or statistical heterogeneity, a random-effects (RE) meta-analysis will be done to yield an overall summary. If RE analyses will be necessary, their results will be presented as the average treatment effect with its 95% confidence interval, and the estimates of T2 and I2. |  |
| Meta-bias(es) | 16 | If the meta-analysis includes more than 10 investigations, reporting biases will be studied using a funnel plot with asymmetry testing. | 9 |
| Confidence in cumulative evidence | 17 | The quality of outcome evidence will be summarized using the Grading of Recommendations Assessment, Development and Evaluation (GRADE) approach. Each grade of evidence will be rated as: high, moderate, low or very low. | 10 |

**\* It is strongly recommended that this checklist be read in conjunction with the PRISMA-P Explanation and Elaboration (cite when available) for important clarification on the items. Amendments to a review protocol should be tracked and dated. The copyright for PRISMA-P (including checklist) is held by the PRISMA-P Group and is distributed under a Creative Commons Attribution Licence 4.0.**

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