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Application of a non-pharmacological technique in addition to the pharmacological protocol for the management of children's preoperative anxiety: A 10 years' experience

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Abstract

The aim of the study was to investigate how Non-Pharmacological Techniques (NPT), in addition to standard pharmacological techniques, can help to manage and reduce the preoperative anxiety of children waiting for Day Surgery procedures (DS). Isola Serena activity started in 2008 to manage the preoperative time of children waiting for surgery in the playing room. The latter is run by a pedagogist. NPT includes use of games and toys, readings and drawings. A descriptive and comparative study was conducted on 50 children, aged 4 to 12 years, randomly assigned to Isola Serena group ISG and control group CG. All children received standard pharmacological techniques, while those of the ISG also received the NPT. The evaluation of the preoperative anxiety level (modified Yale Preoperative Anxiety Scale) and parent's coping style (Coping Inventory for Stressful Situation) compared the two groups. The ISG showed a significantly lower level of preoperative anxiety than the CG. Parents' coping style was not related to the preoperative anxiety. The activity performed in the Isola Serena Project resulted to be effective for the reduction of preoperative anxiety in children undergoing DS procedures.

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Introduction

Preoperative anxiety is characterized by tension, anxiety, nervousness, and fear.[1]

There is evidence in literature that high levels of preoperative anxiety are associated with negative psychological and physiological effects.[2,3]

Among the negative preoperative and postoperative psychological effects there are: nightmares, separation anxiety, altered appetite, increased fear of doctors.[1,3] In 2004 Kain *et al.* estimated occurrence of maladaptive behaviour (generalized anxiety, night cry, bedwetting, separation anxiety and outbursts of anger) in children who had surgery in 50% of cases and occurrence of emergency delirium in 12-18% of cases.[4]

Preoperative and postoperative physiological effects include difficulty in inducing anaesthesia, development of postoperative agitation, and higher levels of postoperative analgesia.[5]

In behavioural postoperative problems some main factors can be identified such as the young age, previous negative experiences with hospitals or medical treatments, post-surgery pain, parents' anxiety, and personality traits of the child (emotional, impulsive, and poorly socializing).[6]

Induction of anaesthesia has been identified as the most stressful moment for children during the perioperative process and 50% to 65% of them can show a great discomfort.[4,7-9] Children are more vulnerable due to the lack of knowledge of the procedures, perceived control, explanations in terms appropriate for age and pain management.[10] In this context, the attitude of the family affects the child's well-being.[11] Parents, like everybody, use adaptive coping strategies to manage stressful situations.[12]

Pharmacological and non-pharmacological methods can be used effectively in order to deal with preoperative anxiety.[13] Pharmacological methods include the use of preoperative sedative drugs administered primarily orally. However, they require compliance from the child, can be a stress source themselves,[14] require strict administration timing, and may not be suitable for children with high levels of impulsiveness.[15]

Non-pharmacological interventions can be identified according to the most effective moment they can be used. A preoperative tour, explaining hospitalization and surgery on other children,[16,17] and therapeutic play can both be done during/before hospitalization.[10] The opportunity to watch movies or cartoons on portable devices and clown therapy are very effective during the phase of inducing anaesthesia.[9,18,19] Play is an essential part of a child's life and can help to regain confidence and to reduce anxiety.[10,20] The limits of non-pharmacological methods are the costs and the inclusion of the procedure in the organization of surgery.[10]

In the Paediatric Surgery of Treviso (Italy), the management protocol of preoperative anxiety includes oral administration of sedative drugs, parental presence at induction of anaesthesia, and, since 2008, a playing activity (called "Isola Serena") proposed during hospitalization, guided by a pedagogist. In IS, playing activity is proposed to improve the healthy part of the child, such as motor, cognitive, and social skills.[20]

This pilot study aimed to evaluate how playing can help to reduce preoperative anxiety of children, also investigating how parents' coping strategies are represented and how they can be related to the preoperative anxiety of their children.

Materials and Methods

Participants

A series of 50 consecutive children scheduled for Day Surgery were enrolled for the study in the period January-April 2019. There were 13 females and 37 males, aged 4 to 12 years. Demographic data are presented in Table 1. The study was in accordance with the ethical standards of the human experimentation committee of Treviso Hospital and the Helsinki declaration (1975 – revision 2013).

Children were randomly assigned to the Isola Serena group (ISG) run with the standard procedure (oral administration of sedatives, parental presence at induction of anaesthesia) and the playroom with the pedagogist, or to the control group (CG) run only with the standard procedure (oral administration of sedative drugs, and presence of a parent during induction of anaesthesia). Parents signed the informed consent ten minutes after the hospital admission. The modified Yale Preoperative Anxiety Scale (m-YPAS) assessed preoperative anxiety and the CISS scale analyzed the distribution of parent's coping strategies. ISG parents were given a short questionnaire to check the overall satisfaction of "Isola Serena" activity that includes use of games and toys, readings and drawings tailored to the different ages. During activities in IS, parents were free to participate or to move out of the room to the adjacent areas.

Instruments

The m-YPAS is a standard criterion for assessing children's anxiety and it includes 5 categories: activity, vocalizations, emotional expressivity, state of arousal, and use of parents. The score varies from 23 to 100 (30 is considered the cut-off for child anxiety in m-YPAS, validated for the English version).[1] M-YPAS is validated to assess anxiety in children undergoing anaesthesia induction and was used in many studies that show efficacy of non-pharmacological techniques in managing children preoperative anxiety.[21] The m-YPAS has good reliability data for children aged 2-12 years.[1]

The CISS (Coping Inventory for Stressful Situation by Endler and Parker 1990; Sirigatti Italian adaptation 2011) is a 48 items measure, 16 for each factor of Task, Emotion, and Avoidance/Distraction oriented coping with a mean score of 45/55.[22] Coping evaluation can be defined as the description of all cognitive, behavioural and emotional aspects that individuals use when engaged in a stressful situation.[12] The CISS scale assesses the general tendency of individuals and excludes response to the specific situation. It is a self-descriptive scale: respondents are asked to indicate "how much you engage in these types of activities when you encounter a difficult, stressful, or upsetting situation?". Coping styles identified by CISS can be categorized into three general types: i) Task-oriented coping (problem-oriented coping) is typical of the individuals who tend to analyse the situation and face it directly; ii) Emotion-oriented coping is typical of the individuals who instead of focusing on the situation, face their emotional reactions and seek for social support; iii) Distraction and avoidance-oriented coping response is typical of the individuals who distract themselves with other situations (job) or tasks in order not to think about the stressful situation.

In the ISG, the m-YPAS scale was used: i) in the playing room, 30 minutes after the child arrived at Isola Serena; ii) in the preoperative waiting room where the child arrived on the bed of the ward with a parent and a nurse. Then the child met the surgery nurse, he was asked about his name and date of birth and parents were asked to wear a hospital gown, shoe covers and surgical mask, in order to accompany their child in the operating room; iii) in the operating room at induction of anaesthesia performed by means of a mask in presence of a parent.

Table 1. Demographic data of children and parents in the ISG (Isola Serena Group) and GC (Control Group).

	ISG	CG	P-value
Sample	25	25	
Children mean age (years)	8.3 (SD 2,2)	8.5 (SD 2)	0.64
Children median age	7	9	
Number by sex (males and females)	20/5	17/8	0.34
Parents' mean age (years)*	41.3 (SD 3.7)	43.1 (SD 4.7)	0.15
Parents' median age (years)*	42	42	
Number by sex of parents (males and females)*	7/18	6/19	0.75

ISG (Isola Serena Group); CG (Control group); *Parent who filled out the CISS scale.

In the CG, the m-YPAS scale was used 30 minutes after admission in the hospital room, in the preoperative waiting room, and in the operating room with the same characteristic of the ISG. At the time of admission one of the parents in both groups was asked to participate in the survey, and, upon approval, the CISS was administered.

Observations were carried out by two pedagogists in Isola Serena and in the surgical area, respectively.

At time of discharge, parents of the ISG were asked to complete a brief questionnaire about perceived quality, in order to evaluate general appreciation on the project. In the questionnaire, parents were asked three questions concerning the way they were welcomed by the pedagogist, room comfort, and usefulness of the playful proposal to cheer up their child. Participants were asked to rate on a 4-point Likert scale (1 – not at all, 2- a little, 3- enough, 4- very satisfied).

Data analysis

Data was analysed with the statistical analysis tool available on Excel for Windows 10. Descriptive statistic was used to describe personal data. One-way analysis of variance was employed, using the F-test, for comparison within and between the groups. Significance level was set at $p < 0.05$. The Bravais-Pearson correlation coefficient was used to analyse the relationship between CISS scores and mean m-YPAS scores.

Results

The mean m-YPAS score in ISG resulted lower than CG in the playing room, preoperative room, and at induction of anaesthesia. There was no significant difference in the ISG in the m-YPAS scores ($p > 0.05$). On the contrary, in the CG there were significant differences in the m-YPAS scores measured in the preoperative room and in the operating room ($p < 0.05$). The level of preoperative anxiety between the two groups at induction of anaesthesia was significantly different ($p < 0.05$; Table 2 and Figure 1).

Most of the older ISG children (7/10 and 11/12 years of age) scored low on m-YPAS, while the majority of the younger ISG children (4/6 years) scored higher on m-YPAS scores in the operating room. Only some of the CG children (4/6 and 7/10 years) scored low on m-YPAS and most of older CG children (11/12 years) scored high on m-YPAS in the operating room (Table 3).

Coping strategies measured with CISS scale showed a similar distribution in the two groups (Figure 2).

We observed the correlation (Bravais-Pearson correlation coefficient) between the mean scores of preoperative anxiety in the three times it was assessed (m-YPAS) and the single factors measured by the CISS scale. The correlation between task-oriented coping and mean scores of preoperative anxiety (m-YPAS) was r = -0.36 and r = -0.05 in ISG and CG, respectively. The correlation between emotion-oriented coping and mean score in preoperative anxiety (m-YPAS) was r =0.29 and r = 0.19 in ISG and CG, respectively. Finally, the correlation between avoidance-oriented coping and mean scores of preoperative anxiety (m-YPAS) was r = -0.28 and r = -0.19 in ISG and CG, respectively.

All parents answered the satisfaction questionnaire related to the Isola Serena activity, resulting in a mean score of 3.87 (SD 0,34) for the welcome of the pedagogist, 3.72 (SD 0,46) for the room comfort, and 3.70 (SD 0,46) for the usefulness of the playful proposal.

Discussion

The present study compared the level of preoperative anxiety in two groups of children. The study group was treated with NPT, consisting of playing activity with a pedagogist, and the control group was given the standard preoperative protocol of the hospital.

This study shows that ISG patients, that is those taking part in the playing room, had lower levels of preoperative anxiety in all the moments considered in the study (the playing room and the preoperative and operative rooms), compared to the CG patients. Indeed, a great percentage of ISG aged 7 to 12 maintained low preoperative anxiety levels until induction of anaesthesia. Those aged 4 to 6 showed higher levels of anxiety at induction of anaesthesia, suggesting that age could affect the efficacy of the playing room on the preoperative anxiety.

The use of modelling clay,[13] toys,[23] videogames, presence of clowns, and preoperative hypnosis,[21] are common and successful strategies employed to reduce the preoperative anxiety. Little is known, instead, about the efficacy of preoperative playroom and playing with an educator as a strategy to reduce the preoperative

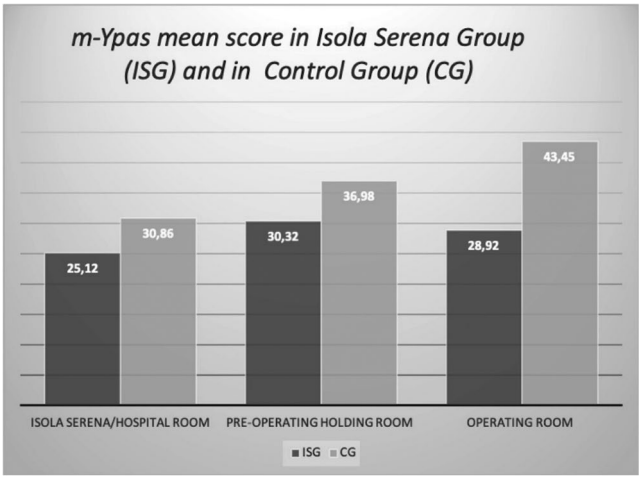

Figure 1. m-YPAS mean score in Isola Serena Group (ISG) and in the Control Group (CG).

Table 2. Mean m-YPAS scores at three different times in ISG and CG.

m-YPAS mean score	Isola Serena *vs.* Hospital room	Preoperative room	Operating room	P-value
Isola Serena Group	25.13 (SD 4.30)	30.32 (SD 9.62)	28.92 (SD 9.32)	0.07
Control Group	30.86 (SD16.57)	36.98 (SD19.01)	43.45*,** (SD 24.30)	0.09

*m-YPAS score difference between the two groups in operating room: F score> F critic (α=0.05); ** m-YPAS score difference between the control groups: F score > F critic (α=0.05).

anxiety in children.[24,25] Hosseinpour and Memarzadeh reported the preoperative playroom as an effective method to reduce anxiety in children who need elective surgery.[24] Weber evidenced that interaction with a pedagogist favoured the management of anxiety.[25]

We think that a place similar to a familiar environment, where children can wait for surgery, makes them feel less disoriented and more able to get involved in pleasant and distracting activities. The use of videogames, as distracting techniques, seems to be effective, as they attract the children into an activity different from the following "surgical time".[21] Involvement in the playing room seems to have similar effects.[25] In this study it was possible to observe that the presence of an educator in the playing room allowed to monitor the activities of the children. Moreover, he/she encouraged game involvement in case the interest decreased or the attention shifted to preoperative fasting. The presence of an educator resulted also beneficial for the parents as they were not constantly busy with their children while waiting for surgery. Efficacy of playing activity on the anxiety arousal by induction of anaesthesia needs to be further investigated. The practice of fun activities in a room provided with different toys and the presence of an educator can be an effective method to reduce children anxiety during the preoperative phase. Play activity seems to have a positive immediate effect, but it can diminish in the long term.[26]

In this study the playing technique seems to be effective to manage the preoperative anxiety until induction of anaesthesia for patients aged at least 7 years.

Moreover, the distribution of the coping profiles of parents was similar between groups. We analysed the correlation between single factors of CISS scale and mean scores of m-YPAS scale. The conclusion suggests a difference that was not significant.

Our results are consistent with other studies showing that preoperative anxiety is not necessarily modified by the presence of parents during anaesthesia induction.[21,27] Furthermore, it is interesting to point out the positive correlation between emotion-oriented coping strategies and the preoperative anxiety in both groups. In case of task-oriented and avoiding-oriented coping strategies the correlation was negative in both groups, especially in ISG.

Coping strategy is a significant moderating variable which influences the level of negative perception of stress in case of stressful events.[28] Parent's answer to stress seems to be dependent on coping styles.[29] Emotional and avoidant coping styles are normally considered maladaptive if compared to task-oriented strategies that seem to be more active and efficient.[24]

Results collected with the satisfaction survey suggest a positive parents' evaluation of ISG, both with regard to the educator and to the ludic proposals.

The findings of this study should be considered in the light of the following limitations. First, the results were obtained from a small number of patients. Nonetheless, this is one of the few studies on the use of a playroom with an educator in the preoperative period. Second, the age difference in each group is wide but the distribution of children according to their age is similar in both groups. Third, data concerning hospitalization have not been investigated and, together to age, temperament and parent coping abilities can affect the preoperative anxiety in children.

Moreover, playing activity can be less effective in the long term. Strengths are the novelty, the methodology, the example of good integration among medical, educational and environmental aspects.

A future direction is to investigate the efficacy of NPT with a pedagogist including previous hospitalization experiences, patients' and parents' trait anxiety. Moreover, it would be interesting to find out the possible benefits resulting from the promotion of efficient coping strategies to cope with the surgical event, considering both parents and children coping strategies. Finally, the satisfaction questionnaire could also be administered to the team with specific questions for feedback on the Isola Serena Project. In conclusion, this study suggests that a playroom with an educator can be an excellent NPT for the management of preoperative anxiety. Indeed, it supports those aspects of the children not related to the disease, such as initiative, creativity, problem-solving, and emotional involvement in playing with adults and peers.[20]

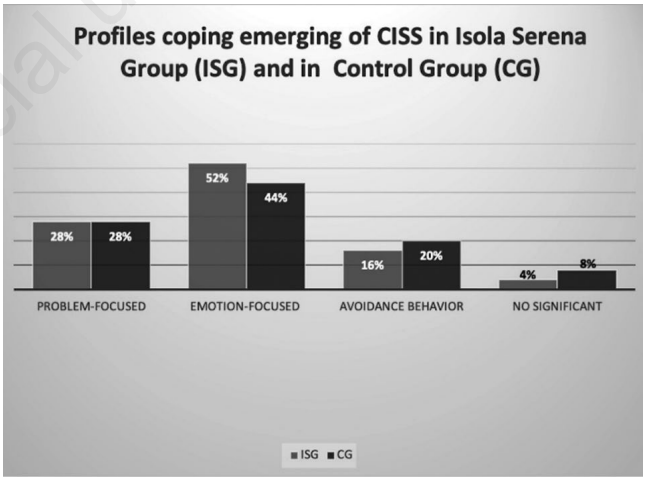

Figure 2. Profiles coping emerging with CISS in Isola Serena Group (ISG) and in the Control Group (CG).

Table 3. Distribution of ISG and CG children according to age and m-YPAS score.

Children age (years)	Sample distribution by age (%)		M-YPAS score (%)							
			Low		High		Increased		Decreased	
	ISG	CG	ISG	CG	ISG	CG	ISG	CG	ISG	CG
4/6	16	20		40	25		75	40		20
7/10	60	60	73	46	13	27	7	27	7	
11/12	24	20	83	20		20	17	60		

Low (it remained under the threshold of 30); high (it remained above the threshold of 30); increased (it exceeded the threshold of 30 only in the operating room); decreased (it diminished under the threshold of 30 only in the operating room).

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