

Short communication

# Hypnosis instead of general anaesthesia in paediatric radiotherapy: report of three cases

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## Abstract

**Purpose:** This report proposes hypnosis as a valid alternative to general anaesthesia for immobilisation and set-up in certain cases in paediatric radiotherapy.

**Methods:** We report three cases of children who underwent radiotherapy in 1994 and were treated using hypnosis for set-up during irradiation. The first and the second were two cases of macroscopic resection of cerebellar medulloblastoma in which craniospinal irradiation was necessary, while the third patient suffered of an endorbital relapse of retinoblastoma previously treated with bilateral enucleation, radiotherapy and chemotherapy; in this last situation the child needed radiation as palliative therapy. Hypnosis was used during treatment to obtain the indispensable immobility. Hypnotic conditioning was obtained by our expert psychotherapist while the induction during every single treatment was made by the clinician, whose voice was presented to the children during the conditioning.

**Results:** Every single fraction of the radiation therapy was delivered in hypnosis and without the need for narcosis.

**Conclusions:** Hypnosis may be useful in particular situations to prepare paediatric cancer patients during irradiation, when lack of child collaboration might necessitate the use of general anaesthesia and when anaesthesia itself is not possible. © 1999 Elsevier Science Ireland Ltd. All rights reserved.

**Keywords:** Hypnosis; Radiotherapy; Paediatric cancer; General anaesthesia

## 1. Introduction

When radiotherapy has to be performed in paediatric cancer patients, the assurance of immobility, during the various phases of treatment (elaboration of treatment planning, CT scanning, simulation and treatment itself), essential for treatment success, sometimes makes the intervention of an anaesthetist indispensable. Profound sedation and general anaesthesia have been used since 1963 [13]: oral, rectal or parenteral instillation of sedatives, soporifics and analgesics yield variable and often unpredictable results [10]. Extensive experience with the use of ketamine, which preserves respiration and airway patency well, compared to inhaled anaesthetics exists. Recently propofol (Diprivan), a new drug, given as an intermittent bolus or as a

bolus followed by continuous infusion, has been proposed as a method permitting safely complete manipulation of the child [10].

In the last few decades many authors have reported experiences in which hypnosis has been used to reduce nausea and vomiting in children and adolescents receiving chemotherapy [7,9,12] or to reduce pain and anxiety during painful procedures in children with cancer [13], but to our knowledge no evidence on medical literature for the use of hypnosis to obtain immobility during set-up and irradiation of children exists.

Hypnosis used to relieve acute pain has a long history (1843) and has been widely used particularly in dental procedures [5,8,11]. It involves a relatively simple dissociation process in which the patient learns to focus his or her attention on stimuli, images that are unrelated to the sense of pain. The process by which the individual becomes hypnotised is related to 'imaginative involvement'. The patient

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become cognitively engaged in a task, such that other stimuli are blocked or reduced in intensity [9]. Research has demonstrated the effectiveness of hypnosis in particular paediatric patients due to their reduced reality binding such that they become absorbed in fantasy.

The aim of this report is to describe our experiences with hypnosis used instead of general anaesthesia during radiation procedures.

## 2. Materials and methods

Since 1994 we have used hypnosis in our department in selected cases of children unable to perform general anaesthesia, uncooperative, or exceptionally apprehensive and therefore who refused to lie still.

From January 1994 to January 1998 we observed 21 patients under 6-years-old out of 67 paediatric patients treated with radiotherapy (34 with total body irradiation for bone marrow transplant, 33 for various other malignant diseases). Nine of these 21 were cooperative during planning, elaboration and radiotherapy; the other ones had to be sedated either pharmacologically or by hypnosis to assure the treatment in conditions of immobility. In six cases, radiotherapy not being urgent and in the absence of a defined date, as sometimes happens with total body irradiation for bone marrow transplant, the children, older than 2 and younger than 6 years, were evaluated and submitted for preradiotherapy hypnosis.

We describe our experiences with the first three children in whom we used hypnosis instead of general anaesthesia during radiation procedures. In each case the child's parents consented to the use of hypnosis.

## 3. Description of the cases

### 3.1. Case 1

The first case was a 5-year-old male who had come to our Department to perform postsurgery radiotherapy due to a medulloblastoma. In July 1993 the child showed some difficulty in walking about, headache and vomiting. A month later a deficit of the sixth cranial nerve appeared. A CT and MRI study of the brain demonstrated a cerebellar tumor in July 1993. During the execution of the radiological study the child went into a coma and was operated on soon after with macroscopic exeresis of the mass. The comatose state lasted 20 days after the surgical intervention with residual important neurological deficits (aphasia, left hemiparesis, lesion of the VII and VI cranial nerves, vocal cord paralysis with stridor, sternal retraction and dyspnea), referable to frontoparietal lobe ischemic lesions. The clinical situation improved slowly in the following weeks only after six cycles of chemotherapy (CDDP and VPI6). He was then followed for craniospinal irradiation in our Department. General anaesthesia due to the presence of brain ischemic

lesions was contraindicated and the anaesthetist's evaluation also showed problems with the artificial respiration (since the child had to stay in the prone position with a table-fixed plastic net mask and a face base). We therefore proposed this case to our psychotherapist as a likely candidate for the possibility of inducing a state of hypnosis. Treatment planning and preparation of the thermoplastic mask for head immobilisation were carried out with mild sedation by the anaesthetist while the simulation and the treatment were done in hypnosis. The conditioning and first hypnotic inductions were done by our psychotherapist using tactile impulses and verbal commands with the count down technique.

During the first hypnotic state the voice of the clinician was introduced to allow the following inductions without the presence of the psychotherapist. We used the imagery of the child who believed he was Batman in his batmobile. The child was conditioned to enter into the hypnotic state as soon as he lay down on the couch of the treatment room. The anaesthetist was present at the initial treatments but his intervention was unnecessary. The craniospinal radiotherapy technique we used was a standard one with the patient in the prone position, an immobilisation mask, two photon lateral craniocervical fields for brain irradiation and a posterior field for the spinal cord using a moving junction at C2. The minimal total dose was 30 Gy (32 Gy ICRU), with a dose/fraction of 1.5 Gy in the first part of the treatment. Two opposed photon lateral fields had been used as booster on the posterior fossa with a dose of 1.8 Gy/fraction for a total of eight fractions (14.4 Gy of minimal dose, 15.2 Gy ICRU). The only problem observed during the period of treatment was to convince the child to lie down since it was something he did not like to do sometimes. We took sometimes 10–15 min to convince him to go on the couch but when the patient was on it, the time necessary to induce hypnosis was less than 30 s. The total time to perform the treatment fraction and hypnosis was about 30 min. During the hypnotic state it was possible to modify the child's set-up, move the couch and the gantry draw on his skin, check the shield's position and perform all the usual verification procedures. His breathing was calm and deep without sternal constriction and stridor. Awakening was obtained at the end of therapy with the same reverse count in a few seconds, even though the child remained a little drowsy for some minutes in his mother's arms. He was nevertheless relaxed after the treatment. Twenty-nine hypnotic inductions were performed for successful treatment for the total period. At the end of treatment he was been deconditioned by our psychotherapist.

### 3.2. Case 2

The second case: a 4-year-old, male. On June 1996 a MRI study demonstrated an infratentorial tumor, in the region of the cerebellar vermis, with a compressive effect on the adja-

cent structures, anterior shift of the brain stem and collapse of the fourth ventricle.

The tumor had a 7-cm diameter and presented necrosis and a cystic structure. The child was subjected to a ventricular-peritoneal drainage implantation for the intracranial hypertension and then to the macroscopic surgical exeresis of the mass. Histological examination demonstrated a medulloblastoma with neuroblastic differentiation. Post-operative MRI showed no macroscopically residual tumor. In accordance with the AIEOP protocol for Brain Tumors in Children, preradiotherapy chemotherapy was performed (using intra-tecal MTX and VCR, carboplatin, MTX and VPI6 e.v.).

The child was an uncooperative one and was thus evaluated for hypnotic conditioning with his parents' consent, since general anaesthesia would have been used 34 times (32 for therapy and 2 for planning).

The technique and the doses were similar to those used in the former case. In this case too the anaesthetist was present initially, but intervention was never necessary. The imagery used, the time needed for hypnotic induction, treatment fraction and awakening were about the same of the first case treated (for a total of 28 times). In this case, in his imagination, he was travelling in a wood looking for mushrooms with the snufs and a king.

### 3.3. Case 3

The third case: a 4-year-old female. She had been treated chronically for a retinoblastoma. In 1991 the child was diagnosed as having a bilateral retinoblastoma: her left eye was enucleated whilst the right orbit was treated with radiotherapy, in a different department, with a total of 39 Gy. The child was then treated with cryotherapy, photocoagulation, chemotherapy and finally surgery due to a recurrence in the right eye. When she came to our observation in November 1994 she was blind with symptomatic local progression of the tumor. Radiotherapy would only be of palliative significance although her psychological condition would have made anaesthesia necessary. The child refused to stay on the couch, perhaps because she remembered previous treatment. So she was conditioned in a different place and carried to the simulation room in hypnosis, she was told that she was having a trip. The first hypnotic state was maintained for all the time needed for CT scanning and simulation performed in two different rooms.

The radiation therapy technique was an isocentric one with two photon beams of X-rays of 6 MV with an incidence of 90° and a bolus for the anterior field; the minimal target dose was 1.5 Gy/fraction for a total of 39 Gy. A single field of electrons (18 MeV) to give an overdose of 15 Gy was then used. A Microtron accelerator which is quite noiseless was used but during treatment it went out of order so a LINAC was chosen. The noise of modulator was introduced into the imagery of the child like as music and no problems were encountered.

Unfortunately during treatment the child became symptomatic with painful paraplegia due to the development of an epidural vertebral metastasis at D3-D6, with a compressive effect on the spinal cord. The treatment on the orbitary lesion was interrupted at a total dose of 42 Gy while symptomatic radiotherapy was performed on the vertebral lesion. During this treatment we were able to obtain two different hypnotic states with a lapse of a few minutes: the first for treatment planning and the second for therapy at the treatment machine. The time of induction was quick. Forty hypnotic inductions were necessary.

## 4. Results

With the induction of this hypnotic state the children remained in the right position for radiation treatment and the time it was necessary. At the end of every single fraction the awakening was not traumatic: the child usually told us the dream he had had just before. There were no problems for daily hypnosis after conditioning in our experience. The third patient died 4 months after treatment for progression of the disease. The first and the second patients are still alive with no evidence of disease and without psychological problems related to the radiotherapeutic procedure.

We used hypnosis in three other children, two for total body irradiation (six fractions, twice a day, more than 1 h for each session) and one for Hodgkin's disease with partial success (after five fractions the child refused the hypnosis but continued radiotherapy anyway with collaboration). In this last case, with an incomplete result, the child had a shock in the past (he had witnessed a dramatic accident), there were conflicts between his parents and other problems in the family and there was insufficient time to perform or propose group therapy. We do not know how these factors might have explained the partial failure, but we think that they may have played some role.

## 5. Discussion and explanation of the hypnosis technique

The use of various kinds of sedation or general anaesthesia has been proposed in the literature for radiotherapy in paediatric uncooperative cancer patients [10]. Hypnosis, a procedure used in other medical contexts, [3,7,11] has never been proposed for radiotherapy. We have reported our experience in using hypnosis for treatment planning and irradiation.

There are many methods for testing susceptibility to hypnosis and determining whether the person with whom one is working is passive-submissive or challenging–dominant (i.e. pendulum test, the fall back test, hand clasp...). Various reports on the possibility of inducing the hypnotic state based on controlled research, indicate that 95% of persons are influenced to some degree and 75% of people are susceptible to hypnotic conditioning. Probably anyone who wishes can be hypnotised, with the possible exception

of mentally deficient persons and babies, since there is considerable difficulty in concentrating attention upon the voice or other things.

We used hypnotic psychological techniques in children aged between 2 and 5 years, able to concentrate on tales or the voice of their mothers, but unable to understand the reasons of the treatment, frightened by the memories of previous hospital experiences and not co-operative with a logical reasoning; for them there was only a possibility of general anaesthesia.

The induction of the hypnotic trance requires physical comfort evoking a relaxed feeling. For this reason the first session, performed to establish confidence and rapport, was performed in a place different from the treatment room (psychologist ambulatory). We accept the patient when one of the parents is co-operative and inclined to teach himself the techniques of relaxation.

We have no experience with children younger than 2 years. Several meetings may be necessary in order to successfully carry out conditioning. Our psychotherapist needed two to seven sessions in 2-10 days to complete conditioning procedures.

For conditioning and hypnotic induction fairy tales, tactile impulses and verbal commands including the count down technique were used.

As a psychological technique we use the following procedures. Firstly, we collect data for a correct approach to the relational world of the child, to evaluate which parent or relative the child considered relaxed and confident. Mothers may not be the best people in this context since their emotional suffering is related to the pain of their children; afraid of a bad prognosis and in great difficulty because they are far from the family and home, from their other children and their husbands. The anguish of the mother can be easily perceived by the child [1].

Our approach needs the presence of the child's mother or the most suitable parent for him during the hypnotic conditioning to cooperate in order to convey a sense of calm and tranquillity.

A brief interview with the parent who will assist the child for the duration of the therapy, oriented to obtain the data indispensable to make an approach to the children's relational reality, is carried out. It is important to know how the little patient reacted to previous hospital admissions and to previous therapies, how the child reacts to relaxing events and if he is interested in hearing fairy tales told by other people [1,2,4]. The next step is to create an acceptance condition either of an extraneous person (the psychologist) or the treatment place by the child and evaluate what attracts the child's attention for the longest possible time (e.g. watching cartoons on television, painting or listening a story). Sometimes it might be necessary to help aggression release by playing or running, entering into these contexts with phrases leading to a gradual slowing down of actions. For example, we focus his attention saying '...after such a long run... your legs may... have the wish to stay comforta-

bly still, while your hands may move your toy the farthest possible from you... but your hands may also try to remain still or move quickly and then.... who knows which hand may stop quickest...?' and so on. Illogical phrases like '...your legs can see along with your eyes .' stop the child's attention and turn his curiosity toward something unusual, introducing then other aspects which allow the slowing down of his attention.

After that we induced the child to believe himself as a character of his favourite tale. The containing metaphors fables are structured according to a communication scheme in three levels (conscious, unconscious and out of consciousness), as proposed by Mills and Crowley [6]. It may be useful to use fables proposed by these authors.

In the metaphor presented to the child, the plot communicates a first conscious level of meaning; the strewn suggestions give the second unconscious level of communication and the process of sensorial weaving communicates the third level (out of consciousness).

In the children we treated, the plot was based around the real world and everyday life as a starting point. In the plot words inducing tranquillity, calm and the well being that maybe felt when one's body is resting, were occasionally introduced.

We then verify the grade of psychological conditioning reached, carrying the sleeping child from the psychological operating room to the rooms in which planning treatment and irradiation will be done.

During the first hypnotic state we introduce step by step the voices of radiotherapist and the noise of treatment unit into the tale, so that the child can continue to sleep undisturbed. Then the same clinician, alone with the child, induces a deep hypnotic state pronouncing simple phrases. Usually tactile stimuli, like caresses, facilitate the induction. The situation is presented to the child in the form of a fantasy trip. The reverse count technique could be used to deepen the hypnotic state at the start and to 'wake up' the child at the end.

Psychologists have various methods to induce the hypnosis process (e.g. finger method, by focussing on an object, short inductions using sounds, tunnel technique, pressure and passes and other sensory-motor methods) and different deepening techniques (confusion and shock techniques, counting). The induction requires essentially two steps: external focus and internal focus. During external focus the child's attention is attracted to a moving or stationary object and after suggestion for heaviness of the eyelids, the child is told to close his eyes with the starting of countdown (the number chosen is related to the ability of the child to count down or up). In the second step (internal focus), the subject is told to concentrate on respiration and every kind of sound, saying: 'The sounds and my voice...can permit you to fall into a deep, deep sleep... your trip (in his imaginary world related to the tale being told) will start when you hear the word ten' (or another number).

The noises which the patient may hear during the radio-

therapy treatment are introduced so that they coincide with the ones he/she can hear during a trip to space or in his/her batmobile, like those seen in cartoons on television, e.g. when we put the immobilisation mask on we say ‘now we are ready for the trip... you will feel my hands touching your head... it’s me who is putting your crash-helmet on to start your trip in the batmobile... the noises you can hear will make you dream and sleep deeper and deeper’ for the setting of the body... ‘now I am touching your hands and your legs... which remain still, motionless and quiet’..., for the couch movement ‘... now you will feel lifted up and shifted...it’s me who is putting you in the starting position... your eyes are closed... sleep deeper and deeper... the headlights are turning on (the light field)... the other lights turn on too... are you ready for the start? in a few seconds you will hear the door closing (the door of the treatment room) and then the trip will start...the noises you could hear will make you feel good, quiet, relaxed... they will make you sleep deeper and deeper; still and motionless for your trip’.

During the irradiation the child receives no verbal stimuli. Only when we have to move the gantry to change the field of treatment we tell the sleeping child what is happening but always putting together the explanations of the stimuli to the imagines previously used in the metaphor or story. At the end of the radiotherapy fraction we awaken the child using the count technique saying ‘... in a little time it will be time to wake up... you will feel as if you have slept for a long time... rested.... now the count will start again and when I say zero you will be awake’ and when we say zero with a rapid click of the fingers he/she awakes. Awakening probably is the easiest part of hypnosis. No one has ever failed to awaken from hypnosis because without instructing the subject simply wakes up naturally, of his own free will.

When all the radiotherapy treatment finishes the child must be deconditioned by the psychotherapist to avoid psychological damage of the procedure, such as ‘trance’ induced by common orders of every day life, similar to the situations used during the procedures for radiotherapy. These events are infrequently reported and in our patients none were ever observed.

All these procedures require the presence of a psychotherapist qualified for hypnosis. The usual length of the specialisation in this field is of some years (usual 4) of training and specific courses for psychologist. However radiotherapists who hypnotise children, previously conditioned by a psychotherapist, every day, need training lasting only a few hours, because he must only learn the simple specific procedures and the words to induce the hypnotic state. In our opinion, however only people who have the patience and understanding to deal with young patients should use these procedures.

## 6. Conclusion

About 75% of people are susceptible to hypnotic condi-

tioning. Children in particular are very sensitive. Hypnosis may be useful in some particular situations as in the case of very young children who have to be treated with radiotherapy. The procedure is however complex, time consuming and needs a dedicated team with a full time psychotherapist, present during every radiotherapy fraction. If this is not possible, psychological training for the clinician who daily hypnotises the child, after conditioning by the psychotherapist, is necessary. This training requires a short time (in terms of hours) because the clinician has to do simple things to induce the hypnotic state in the child previously conditioned by the psychotherapist. However general anaesthesia might be more demanding, because every time it needs the presence of one or two clinicians and equipment for the total length of the fraction. On these grounds, in our opinion hypnosis is not for routine use but should be reserved for particular cases in which general anaesthesia is necessary but difficult to realise such as in the cases described here. However, when hypnosis is successful the gain is considerable both for the child from a clinical point of view (heavy general anaesthesia is not performed) and for the economic aspect, which should be also considered.

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