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Patients' perception and attitude to totally implantable venous access for urologic or digestive cancer: a cross-sectional study.

[Perception et attitude des patients vis-à-vis de leur chambre implantable : une étude transversale en oncologie uro-digestive.]

Short title: percepTIVA

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Abstract

Introduction: Totally implanted venous access (TIVA) improves the safety and welfare of patients treated with cancer chemotherapy (CCT). We aimed to evaluate patients' perception of TIVA placement, TIVA use, and information on TIVA, and to assess the association between patients' perception and their attitude regarding a potential TIVA re-implantation. **Methods:** We conducted a single center cross-sectional survey in a university hospital in Northern France. Patients included were consecutive urologic or digestive cancer inpatients admitted for a CCT cycle via TIVA between April 9th and May 9th 2014. We analyzed patients' satisfaction, experience, and attitude, especially when requiring potential TIVA re-implantation under local anesthesia (LA), using a standardized questionnaire and medical records. We analyzed risk factors for refusing potential TIVA re-implantation under LA using multivariate logistic regression. **Results:** Eighty-one patients were interviewed (no refusals), including 57 with a TIVA device placed under LA in our university hospital. Among them, 52/57 (91%) reported satisfactory TIVA placement, but respectively 21/57 (37%) and 18/57 (32%) complained of painful or uncomfortable TIVA placement; 51/57 (89%) were satisfied with care provided during CCT cycles. Risk factors for refusing potential re-implantation under LA were: TIVA placement considered painful ($p=0.012$) or uncomfortable ($p=0.038$) and dissatisfaction with care provided during CCT cycles ($p=0.028$). **Discussion:** We show that despite good overall satisfaction regarding TIVA, some aspects were less positive and warrant improvement actions. It suggests that these actions could not only improve patients' experience of TIVA use but could also facilitate continuation of treatment in the long term.

Keywords: Intraoperative period; Chemotherapy; Medical oncology; Patient satisfaction; Vascular access devices.

Résumé

Introduction : Les chambres implantables (CI) ont amélioré la sécurité des patients traités par chimiothérapie anticancéreuse (CAC). Nos objectifs étaient d'évaluer la perception des patients vis-à-vis de leur CI posée dans l'établissement (pose, utilisation, information) et d'analyser l'association entre cette perception, et l'attitude des patients vis-à-vis d'une éventuelle repose de CI. **Méthode :** Pour cette étude transversale monocentrique au CHU de Rouen, nous avons inclus des patients atteints d'un cancer uro-digestif admis pour une CAC entre avril et mai 2014. Nous avons évalué la satisfaction, l'expérience et l'attitude des patients à l'aide d'un questionnaire standardisé, et recherché au moyen d'une régression logistique multivariée les caractéristiques du patient et de sa prise en charge associées au refus d'une éventuelle repose de CI sous anesthésie locale (AL). **Résultats :** Quarante-vingt-un patients ont été interrogés (aucun refus), dont 57 avec une CI posée sous AL au CHU de Rouen ; 52/57 (91%) étaient satisfaits de la pose de CI, mais respectivement 21/57 (37%) et 18/57 (32%) rapportaient une pose de CI

douloureuse ou inconfortable ; 51/57 (89%) étaient satisfaits des soins de CAC. Les facteurs associés au refus d'une éventuelle repose de CI sous AL étaient : une pose de CI douloureuse ($p=0,012$) ou inconfortable ($p=0,038$) et l'insatisfaction des soins de CAC ($p=0,028$). **Discussion** : Malgré une bonne satisfaction générale à l'égard des CI, nous avons identifié des aspects qui justifieraient des mesures d'amélioration. Ces mesures pourraient non seulement améliorer l'expérience des patients mais également faciliter la continuité du traitement sur le long terme.

Mots-clés : Période peropératoire ; Chimiothérapie ; Oncologie médicale ; Satisfaction des patients ; Dispositifs d'accès vasculaire.

Introduction

In France, the number of patients receiving cancer chemotherapy (CCT) has increased by 1 to 2 per cent each year since 2009 [1]. In 2012, 273,892 patients were treated with CCT in French hospitals, with an average number of 7.7 CCT cycles per patient [1]. Totally implanted venous access (TIVA) is now the main route for CCT administration [1]. Although TIVA is recognized as having improved patients' safety and welfare compared to other venous access systems [2,3], there is scarcity of information in the literature on patients' perception of their TIVA.

Previous studies have suggested good overall patient satisfaction regarding TIVA [4–11], with a satisfaction rate above 80% [5–7,10,11]. Studies on patients' attitude regarding TIVA, found that more than 80% of patients were ready to recommend TIVA placement to other patients [6,7,12,13], or willfully accept re-implantation if necessary [6]. Studies found that most patients preferred administration of CCT cycles via TIVA rather than other alternatives like peripheral vein access or long lines [11–15]. However, some studies reported a significant proportion of painful or uncomfortable TIVA placements [4,6,14] or TIVA use [4,16].

To our knowledge, only a few studies have analyzed patients' perception of medical care, including information given, during the different steps of the TIVA care process (before TIVA placement, during TIVA placement, and during TIVA use for CCT cycles) and patients' attitude relative to their TIVA [6,10,11]. Furthermore, we retrieved only two surveys that evaluated factors associated with patients' favorable perception of TIVA [6,10]. Kreis et al. [6] showed that faster hospital procedures, good cosmetic results, and the ability to cope with the social environment, increased patients' satisfaction, whereas fear of port punctures, inconvenient heparinization of the port, and fear of complications, were found to be variables associated with dissatisfaction. In addition, Nagel et al. [10] showed that good cosmetic results increased patients' satisfaction.

It is recommended to place TIVA devices under local anesthesia (LA) [17]. Cancer patients may need multiple successive TIVA placements because of TIVA complications, or cancer recurrence. However, to our knowledge there are no existing studies on the association between characteristics of TIVA placement and patients' attitude regarding a potential TIVA re-implantation. Our hypothesis was that patients' misperception of a first placement under LA could lead to refusal of re-implantation if a new TIVA placement was required.

Therefore, we aimed to evaluate cancer patients' perception of TIVA placement, TIVA use, and information on TIVA, and to assess the association between patients' perception and their attitude regarding a potential TIVA re-implantation. We

performed this evaluation in patients with either urologic or digestive cancer, in a tertiary care university hospital in Northern France.

Methods

The survey was conducted during April and May 2014 in digestive or urologic cancer patients as part of a quality of care assessment. In our tertiary care university hospital, CCT cycles for patients with either digestive or urologic cancers are performed in one of two CCT units (a day-hospital and a week-hospital), belonging to the same department. TIVA devices are implanted by digestive surgeons for patients with digestive cancers, and by urology surgeons for patients with urologic cancers.

Study design, population and setting

We conducted a cross-sectional survey using a standardized questionnaire and medical records. Patients included were consecutive urologic or digestive cancer inpatients admitted for a CCT cycle via TIVA between April 9th and May 9th 2014 in one of our two CCT units.

All patients were included regardless of the date of TIVA placement. Exclusion criteria were: Patients whose TIVA device was placed in another hospital, patients whose TIVA device was placed under general anesthesia, patients on their first CCT cycle, and patients not able to answer the questions in the survey. Patients who received several CCT cycles during the study period were only surveyed once. All patients gave their written informed consent to participate in the survey. Patients were informed that they could decline survey participation without any impact on their treatment. Prior to data collection, the questionnaire had been tested on ten patients in March 2014 to check whether the questions were understandable.

The survey was approved by Rouen University Hospital's ethics review board.

Data collection

A standardized questionnaire (appendix 1) was administered during face to face interviews by one of four trained investigators (two residents of public health medicine and two health care engineers with a master's degree in quality and safety in healthcare). The investigators visited the two CCT units each weekday during the inclusion period. Patients were interviewed during one of their CCT cycles in one of our two CCT units. In addition to the questionnaire, some data were retrieved from patients' medical records (cf. collected data). Medical records were accessed after patients had given their written informed consent.

Collected data

Patients' perception of the different steps of the TIVA care process, their attitude regarding potential TIVA re-implantation and their willingness to recommend TIVA placement to other patients in a similar situation, were collected via the questionnaire (appendix 1).

Patients were also asked to give medical and demographic information:

- age,
- gender,
- BMI,
- type of cancer (digestive or urologic cancer),
- occupational category,
- date and place of TIVA placement,
- whether TIVA placement had been postponed,
- whether one CCT cycle had been administered before TIVA placement,

- type of anesthesia for TIVA placement,
- number of TIVA placements.

In addition, the following data were retrieved from patients' medical records:

- time between decision-making and TIVA placement,
- insertion vein,
- time spent in the operating room,
- date and place of TIVA placement.

Furthermore, TIVA complications were identified through the TIVA complication prospective surveillance implemented since 2009, described in detail in a previous paper [18].

Statistical analyses

First, we summarized the population distribution according to each item in the questionnaire. Then, we performed univariate analyses to find factors associated with refusal of potential TIVA re-implantation under LA, using Mann-Whitney test for continuous variables and Fisher exact test for categorical variables. Perception factors were dichotomised for analysis. Significant factors with a $p < 0.05$ were included in a multivariate logistic regression model using a forward – backward selection. We assessed model fitting by calculating the area under the ROC curve (AUC). Statistical analyses were conducted with SAS® (version 9.3, SAS Institute, Cary, NC).

Results

A total of 81 patients were interviewed from April 9th to May 9th 2014, including 57 with TIVA implanted under LA in our tertiary university hospital (figure 1). No patient refused to participate in the survey. Only two patients refused access to their medical records. Patients' characteristics are displayed in table 1. Most included patients had digestive cancer (51/57) and the median duration of TIVA placement was 6 months at the time they were interviewed. We identified 5 TIVA complications in five patients: one displacement of the distal extremity of the catheter, one extravasation, one bacteremia (*E. coli*), one catheter obstruction and one thrombosis.

Results regarding patients' perception, satisfaction, and attitude regarding TIVA, are displayed in table 2. Although patients were globally satisfied with TIVA placement and use, and largely recommended TIVA placement to other patients, they frequently complained about information, pain, discomfort, anxiety, and some declared that they would refuse potential TIVA re-implantation under LA (table 2).

In univariate analysis, we found seven factors associated with refusing potential TIVA re-implantation under LA (table 3): painful TIVA placement, uncomfortable TIVA placement, TIVA placement perceived as long, anxiety during TIVA placement, TIVA placement not consistent with information given, painful CCT cycles, and patients' dissatisfaction with care provided during CCT cycles. The factor "placement not consistent with information given" was not included in multivariate logistic regression because there were too many (six) "no opinion" data, but the other factors were included in multivariate analysis. Painful TIVA placement ($p=0.012$) and uncomfortable TIVA placement ($p=0.038$) were independent risk factors for refusing potential TIVA re-implantation, whereas satisfaction with care provided during CCT cycles was a protective factor ($p=0.028$) (table 4). The AUC of the multivariate logistic regression model was equal to 0.91 (confidence interval 95% [0.84 to 0.99]) (appendix 2).

Discussion

Our survey confirms good overall patient perception of TIVA, as previously reported in the literature [4–11]. However, it also shows that patients' perception was more reserved regarding some steps of the TIVA care process. This was the case for information regarding TIVA placement and functioning, and for TIVA placement under LA. Moreover, when patients considered that TIVA placement under LA was painful or uncomfortable, and when patients were dissatisfied with care provided during CCT cycles, this was associated with a higher probability of refusing potential TIVA re-implantation under LA. This refusal could lead to a preference for re-implantation under general anesthesia.

This is the first time to our knowledge that a relation has been suggested between patients' perception of TIVA placement and attitude regarding further potential treatment. It highlights the importance of quality of care, not only for ethical reasons (i.e. preserving the patient from all preventable pain and discomfort), but also because it suggests that in these patients with long-term therapy, the ability to continue the treatment may sometimes depend on the quality of care at the beginning of the care process, even when suboptimal quality is not directly related to the procedure (here, patients' dissatisfaction with care provided during CCT cycles was associated with a higher probability of refusing TIVA re-implantation under LA). At the very least, it suggests that hospital caregivers must systematically evaluate patients' pain and comfort during TIVA placement and CCT cycles. For instance, patients' discomfort could be systematically checked as part of the preoperative checklist.

Concerning information given to patients, some previous studies also found a dissatisfaction rate greater than 10% [9,10]. These results are consistent with those of Merle et al. [19], who showed that delivering written information could be associated with improved patients' satisfaction. Health facilities could easily generalize such an approach to improve patients' satisfaction. Furthermore, in our university hospital, oncology residents often give information on TIVA placement. It may be relevant that they observe TIVA placements during their university-hospital training to improve their knowledge of this surgical procedure.

Notwithstanding, this present survey has several limitations. First it was performed in a single center and we cannot assume that these results are reproducible in other settings. Second, we included a majority of digestive cancer patients and our sample was comparatively small, even if the sample size in previous surveys was similar to ours [4,9–12,14–16]. Nevertheless, the size of our sample was sufficient to identify risk factors associated with refusal of potential TIVA re-implantation under LA. Third, an information bias can not be excluded as some patients might not wish to declare their dissatisfaction to the investigator. However, the fact that the investigators were not actually involved in caring for the patients helped to limit this bias. In addition, we also analyzed criteria on patients' past or potential future experience. Criteria based on patients' experience may be less affected by reporting bias. However, we observed a long median duration between TIVA placement and our survey. This may have led to a memory bias regarding patients' perception of information given before TIVA placement and their perception of actual TIVA placement.

Existing tools have not yet been validated for the retrospective assessment of anxiety [20–25]. Regarding acute pain due to medical procedures, the French Federation of cancer centers recommends evaluating pain before, and immediately after, painful procedures [26], which was not possible in our survey.

We did not include potential confounding factors, such as comorbidities and cosmetic results regarding TIVA or patients' psychological characteristics, in the multivariate analysis of risk factors for refusing potential TIVA re-implantation under LA. However,

our regression model had an excellent discriminating ability according to criteria by Hosmer and Lemeshow [27]. This result suggests the absence of an important confounding bias.

Despite these limitations, the major strength of our survey was the inclusion of all patients in our tertiary university hospital who received CCT cycles during the study period, via TIVA placement under LA, thus limiting selection bias. The fact that we explored patients' perception of each step of the TIVA care process, both globally and specifically, was another strength of our survey.

Conclusion

In conclusion, our survey shows first, that despite good overall satisfaction regarding TIVA, some aspects were less positive and warrant improvement actions, and second, that these actions could not only improve patients' experience of TIVA use but could also facilitate continuation of treatment in the long term. For our patients who spend such long periods of time in hospital it is crucial that we, as caregivers, give full consideration to their satisfaction and well-being.

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Conflicts of interest

None.

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Figure legends

Figure 1: Flow chart

TIVA, totally implanted venous access

Figure 1: Flow chart

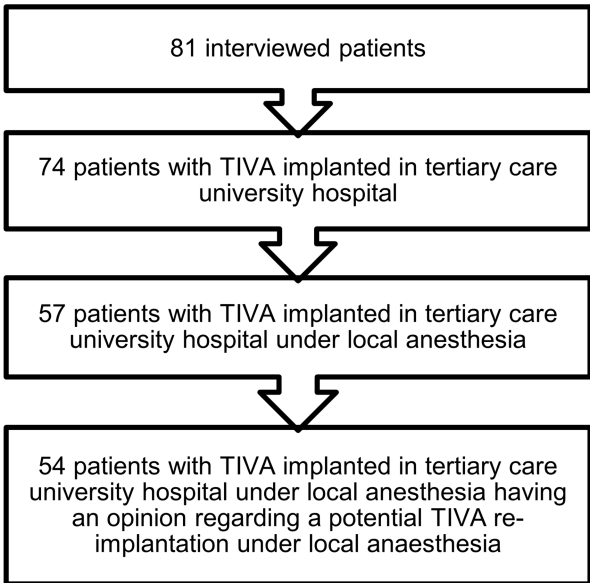


Table 1: Baseline characteristics (N = 57).

Variable	(N = 57)
Age (years) ^a ; median (min-max)	66 (36 - 83)
Male ^a ; n (%)	35 (61)
BMI ^a (kg/m ²); n (%)	
< 19	4 (7)
[19 - 25[29 (51)
[25 - 30[16 (28)
≥ 30	8 (14)
Cancer ^a ; n (%)	
Urologic	6 (11)
Digestive	51 (89)
Occupational category ^a ; (1 missing data); n (%)	
Retired	30 (54)
Manager, higher intellectual profession	6 (11)
Employee	3 (5)
Laborer	6 (11)
Craftsperson or business leader	4 (7)
Unemployed	2 (4)
Other	5 (9)
TIVA placement in ambulatory unit ^{a c} ; (2 missing data); n (%)	26 (47)
Single TIVA placement ^a ; n (%)	50 (88)
Duration of TIVA placement ^{a c} (months) ; median (min-max)	6 (1 - 80)
Patients with TIVA complication ^b ; n (%)	5 (9)
TIVA placement postponed ^a ; n (%)	8 (14)
Administration of at least one CCT before TIVA placement ^a ; n (%)	9 (16)
Time between decision-making and TIVA placement (days) ^c ; (2 missing data) ; median (min-max)	19 (4 - 74)
Insertion vein ^c ; (11 missing data); n (%)	
Cephalic	41 (89)
Subclavian	1 (2)
Jugular	4 (9)
Time spent in the operating room for TIVA placement ^c (min); (5 missing data) ; median (min – max)	81 (37 - 188)

^a Data collected by questionnaire

^b Data collected by prospective surveillance of TIVA complications

^c Data collected in medical records

BMI, body mass index, TIVA, totally implanted venous access, CCT, cancer chemotherapy

Table 2: Patients' perception and attitude throughout the TIVA process (N=57); n (%).

Item	No	Rather no	Rather yes	Yes	No opinion
<i>Patients' perception of information given</i>					
Satisfaction with information given before TIVA placement	6 (11)	2 (4)	10 (18)	39 (68)	0 (0)
Satisfaction with information given on TIVA placement	7 (12)	4 (7)	10 (18)	36 (63)	0 (0)
Satisfaction with information given on TIVA functioning	4 (7)	6 (11)	9 (16)	38 (67)	0 (0)
<i>Patients' perception of TIVA placement</i>					
Satisfaction with organization of TIVA placement	3 (5)	1 (2)	10 (18)	42 (74)	1 (2)
Patient notified in advance of TIVA placement	3 (5)	1 (2)	6 (11)	45 (79)	2 (4)
Anxiety before placement	36 (63)	7 (12)	10 (18)	3 (5)	1 (2)
Anxiety during placement	33 (58)	3 (5)	10 (18)	10 (18)	1 (2)
Painful TIVA placement	33 (58)	2 (4)	6 (11)	15 (26)	1 (2)
Uncomfortable TIVA placement	36 (63)	2 (4)	4 (7)	14 (25)	1 (2)
TIVA placement perceived as long	27 (47)	2 (4)	9 (16)	17 (30)	2 (4)
Placement consistent with information given	10 (18)	2 (4)	14 (25)	24 (42)	7 (12)
Reassuring caregivers	2 (4)	2 (4)	6 (11)	45 (79)	2 (4)
Post-operative pain	42 (74)	2 (4)	3 (5)	6 (11)	4 (7)
Satisfaction with TIVA placement in the operating room	5 (9)	NA	NA	52 (91)	0 (0)
<i>Patients' perception of CCT cycles</i>					
Painful TIVA use	45 (79)	6 (11)	2 (4)	4 (7)	0 (0)
Fear of complications	42 (74)	7 (12)	6 (11)	2 (4)	0 (0)
Uncomfortable TIVA use	43 (75)	7 (12)	7 (12)	0 (0)	0 (0)
TIVA functioning according to patient's expectations	1 (2)	0 (0)	4 (7)	51 (89)	1 (2)
Satisfaction with care provided during CCT cycles	4 (7)	NA	NA	51 (89)	2 (4)
<i>Patients' perception outside of CCT cycles</i>					
Pain outside of CCT cycles	49 (86)	2 (4)	3 (5)	0 (0)	3 (5)
TIVA was troublesome outside of CCT cycles	43 (75)	4 (7)	3 (5)	4 (7)	3 (5)
<i>Patients' attitude</i>					
Patient would accept TIVA re-implantation if similar situation	1 (2)	NA	NA	55 (96)	1 (2)
Patient would accept TIVA re-implantation of non-functioning TIVA	1 (2)	NA	NA	53 (93)	3 (5)
Patient would recommend placement of TIVA to other patients in similar situations	0 (0)	NA	NA	56 (98)	1 (2)
Patient would accept TIVA re-implantation under local anesthesia	11 (19)	NA	NA	43 (75)	3 (5)

NA, non applicable, TIVA, totally implanted venous access, CCT, cancer chemotherapy

Table 3: Risk factors for refusing TIVA re-implantation under LA: Univariate analysis.

Item	No (n=11)	Yes (n=43)	p ^a
<i>Baseline characteristics</i>			
Age (<i>years</i>), median (min-max)	68 (54-78)	66 (36-83)	0.864
Male, n (%)	4 (36)	29 (67)	0.085
BMI < 25, n (%)	6 (55)	25 (58)	1.000
Digestive cancer	11 (100)	37 (86)	0.327
Retired (1 missing data), n (%)	4 (36)	24 (57)	0.313
TIVA placement in an ambulatory unit (2 missing data), n (%)	3 (27)	21 (51)	0.190
Single TIVA placement, n (%)	1 (9)	5 (12)	1.000
Duration of TIVA placement (<i>months</i>), median (min-max)	16 (1-59)	7 (1-80)	0.983
Patients with TIVA complications, n (%)	0 (0)	4 (9)	0.571
TIVA placement postponed, n (%)	2 (18)	6 (14)	0.659
Administration of at least one CCT before TIVA placement, n (%)	1 (9)	7 (16)	1.000
Time between decision-making and TIVA placement (<i>days</i>), (2 missing data), median (min-max)	12 (4-67)	19 (4-74)	0.475
Insertion vein = cephalic (10 missing data), n (%)	8 (80)	31 (91)	0.317
Time spent in the operating room for TIVA placement (<i>min</i>), (5 missing data), median (min-max)	101 (75-188)	80 (37-165)	0.133
<i>Patients' perception of information given</i>			
Satisfaction with information given before TIVA placement, n (%)	10 (91)	37 (86)	1.000
Satisfaction with information given on TIVA placement, n (%)	7 (64)	36 (84)	0.206
Satisfaction with information given on TIVA functioning, n (%)	10 (91)	36 (84)	1.000
<i>Patients' perception of TIVA placement</i>			
Satisfaction with the organization of TIVA placement (1 "no opinion" data), n (%)	9 (90)	40 (93)	1.000
Patient notified in advance of TIVA placement (2 "no opinion" data), n (%)	9 (100)	39 (91)	1.000
Anxiety before TIVA placement, n (%)	2 (18)	10 (23)	1.000
Anxiety during TIVA placement, n (%)	7 (64)	12 (28)	0.038
Painful TIVA placement, n (%)	9 (82)	11 (26)	0.001
Uncomfortable TIVA placement, n (%)	8 (73)	10 (23)	0.004
TIVA placement perceived as long (1 "no opinion" data), n (%)	9 (82)	16 (38)	0.016
Placement consistent with information given (6 "no opinion" data), n (%)	4 (40)	33 (87)	0.005
Reassuring caregivers (1 "no opinion" data), n (%)	9 (82)	40 (95)	0.187
Postoperative pain (3 "no opinion" data), n (%)	3 (33)	6 (14)	0.185
Satisfaction with TIVA placement in the operating room, n (%)	8 (73)	41 (95)	0.052
<i>Patients' perception during and outside of CCT cycles</i>			
Painful CCT cycles, n (%)	4 (36)	2 (5)	0.012
Fear of complications, n (%)	3 (27)	5 (12)	0.337
Uncomfortable TIVA use, n (%)	3 (27)	4 (9)	0.140
TIVA functioning according to patient's expectations (1 "no opinion" data), n (%)	10 (91)	42 (100)	0.208
Satisfaction with care provided during CCT cycles (1 "no opinion" data), n (%)	8 (73)	41 (98)	0.025
Pain outside of CCT cycles (2 "no opinion" data), n (%)	1 (10)	2 (5)	0.481
TIVA was troublesome outside of CCT cycles (2 "no opinion" data), n (%)	3 (30)	4 (10)	0.120

^a Fisher-exact or Mann-Whitney test.

LA, local anesthesia, TIVA, totally implanted venous access, CCT, cancer chemotherapy

Table 4: Risk factors for refusing TIVA re-implantation under LA: Multivariate analysis.

Item	ORa [CI95%]	P
Painful TIVA placement	18.5 [1.9 – 178.3]	0.012
Uncomfortable TIVA placement	7.5 [1.1 – 49.7]	0.038
Satisfaction with care provided during CCT cycles	0.03] 0.0 – 0.7]	0.028
LA, local anesthesia, TIVA, totally implanted venous access, CCT, cancer chemotherapy		