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## Journal of PeriAnesthesia Nursing

journal homepage: [www.jopan.org](http://www.jopan.org)

## Research

## Perioperative Comfort and Discomfort: Transitioning From Epidural to Oral Pain Treatment After Pancreas Surgery: A Qualitative Study

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## A B S T R A C T

## Keywords:

epidural analgesia  
postoperative pain  
pancreas cancer  
patient comfort  
perioperative nursing  
sense of control

**Purpose:** To explore patients' experiences of pain treatment in the perioperative period after surgery for pancreatic cancer.

**Design:** A qualitative descriptive design using semi-structured interviews.

**Methods:** This study was a qualitative study based on 12 interviews. Participants were patients that had undergone surgery for pancreatic cancer. The interviews were conducted 1 to 2 days after the epidural was turned off, in a surgical department in Sweden. The interviews were analysed with qualitative content analysis. The Standard for Reporting Qualitative Research checklist was used for reporting the qualitative research study.

**Findings:** The analysis of the transcribed interviews, generated one theme: Maintaining a sense of control in the perioperative phase, and two subthemes: (i) Sense of vulnerability and safety, and (ii) Sense of comfort and discomfort, were found.

**Conclusion:** The participants experienced comfort after pancreas surgery if they maintained a sense of control in the perioperative phase and when the epidural pain treatment provided pain relief without any side effects. The transition from epidural pain treatment to oral pain treatment with opioid tablets was experienced individually, from an almost unnoticed transition to the experience of severe pain, nausea, and fatigue. The sense of vulnerability and safety among the participants were affected by nursing care relationship and the environment on the ward.

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Access to adequate pain relief is a human right and despite the prevalence of pain and its impact on quality of life, undertreatment of pain remains a major problem.<sup>1</sup> Patients who undergo surgery experience acute postoperative pain, but less than half of them report adequate pain relief.<sup>2</sup> The incidence of persistent postoperative pain, defined as clinical discomfort that lasts more than 2 months post-surgery,<sup>3</sup> is 30% to 50%. Persistent postoperative pain leads to decreased quality of life and negative burden on individuals, families, and society.<sup>4</sup> A recent study supports the use of regional anesthesia in adult patients to prevent persistent postoperative pain after several types of surgery.<sup>4</sup>

Nearly 1,500 individuals in Sweden were diagnosed with cancer of the pancreas and periampullary region in 2019.<sup>5</sup> The diagnosis

was equally distributed between men and women<sup>5</sup> and the incidence rates for both men and women increased with age, with almost 90% of all diagnosed patients aged 55 years or older.<sup>6</sup> Pancreas cancer is often fatal due to late diagnosis. After curative surgery and adjuvant chemotherapy, the median survival period is 2 to 4 years.<sup>7</sup> The only hope for cure is surgical resection, but only 20% of patients with a new diagnosis are eligible for potentially curative treatment.<sup>8</sup> The onset symptoms of pancreas cancer include cholestasis, jaundice, fatigue, weight loss, and abdominal pain, but unfortunately these are also signs for an advanced stage of the disease.<sup>9</sup> Curative surgery is performed when it is possible to resect the whole tumour. Palliative surgery is performed when the cancer is widespread, with the primary purpose being symptom relief.<sup>10</sup>

Postoperative pain is unavoidable, but there are risk factors negatively associated with postoperative pain, for example, young age, gender (women), preoperative pain, and use of preoperative analgesia.<sup>11</sup> Postoperative pain treatment should be effective and relieve surgery related pain, both at rest and during movement. Opioids are

Conflict of Interest: None to report.

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<https://doi.org/10.1016/j.jopan.2022.06.007>

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Please cite this article as: M.B. Englid et al., Perioperative Comfort and Discomfort: Transitioning From Epidural to Oral Pain Treatment After Pancreas Surgery: A Qualitative Study, Journal of PeriAnesthesia Nursing (2022), <https://doi.org/10.1016/j.jopan.2022.06.007>

effective in treating postoperative pain, but are associated with side effects such as nausea and constipation.<sup>12</sup> A combination of different analgesics to achieve additive effects and minimize side effects are often used to reduce pain and the perioperative stress response.<sup>13</sup> Body stress response to major surgery has been linked to malignant progression and spread of cancer.<sup>14</sup> Studies have also shown that opioids may contribute to cancer progression. Whether use of morphine augments risk of metastasis or recurrence after cancer surgery, is not clear.<sup>15–17</sup>

Epidural pain treatment is the most common pain regime after pancreas surgery.<sup>18</sup> It is effective, well tolerated, and severe negative side effects are rare.<sup>19</sup> Epidural pain treatment as an addition to anesthesia during and after surgery, may reduce the risk for respiratory and cardiovascular complications, postoperative nausea, improve recovery of bowel function, and reduce postoperative mortality.<sup>20</sup> The use of epidural pain treatment can reduce the incidence of delirium and improve immediate postsurgical pain control, accelerating recovery and reducing the development of persistent postoperative pain.<sup>14</sup> Patients undergoing open pancreatectomy with epidural pain treatment experienced significantly lower pain scores in the first postoperative days compared to patients without epidural pain treatment.<sup>21</sup>

Comfort is central to patients' experience and incorporates more than just the absence of pain.<sup>22</sup> From the patients' perspective, comfort is multidimensional, characterized by relief from physical discomfort and strengthened by one's ability to cope with the challenges of illness, injury, and disability.<sup>23</sup> Pain is a commonly occurring discomfort in the perioperative phase after open abdominal surgery.<sup>22,24</sup> Patients indicate that comfort is a transient and dynamic state that entails ease from pain as well holistic care and information.<sup>22</sup> To promote comfort, nursing actions in the operating room aim to relieve and ease pain, relieve anxiety by touching and creating a private sphere.<sup>25</sup> In Kolcaba's comfort theory, comfort is experienced in four different contexts: physical, psychospiritual, environmental, and sociocultural. Kolcaba<sup>26</sup> emphasizes that comfort measures may support the patient when discomforts cannot be alleviated. Comfort is a positive outcome and is an important indicator to measure in perianesthesia care.<sup>27</sup> To keep the patient comfortable and pain free is vital, but there is no generally accepted recommendation on how and when the transition from epidural pain treatment to oral pain treatment after pancreas surgery should take place. There is a lack of studies describing patients' experiences of pain treatment after pancreas surgery and patients' experiences of transitioning from epidural to oral pain treatment. While epidural pain treatment is commonly used for postoperative pain

treatment, little is known of patients' experiences of epidural pain treatment after surgery, and there is a knowledge-gap concerning patients' experiences of transitioning from epidural pain treatment to oral pain treatment.

## Purpose

To explore and describe patients' experiences of pain treatment in the perioperative period after surgery for pancreas cancer.

## Methods

### Design

A descriptive qualitative design was used to explore the participants' experiences of pain management after pancreas surgery. Semi-structured interviews were conducted, and qualitative content analysis was used to analyze the interviews.<sup>28</sup>

### Participants and Context

The study was conducted at a surgical department at a University Hospital in Sweden. At the enrolment reception 1 week prior to surgery, prospective participants received written information about the study from a research nurse. To be included in the study, participants had to be able to communicate in Swedish, have no cognitive impairment, have undergone open pancreas surgery, and have had epidural pain treatment in the postoperative phase. In total, 44 potential participants were informed about the study. Two to three days after surgery, the first author (MB) approached the patients that fulfilled the inclusion criteria and asked if they wanted to participate in the study, providing additional information if needed, and obtaining written consent.

Twelve participants, seven men and five women, met the inclusion criteria and all agreed to participate.<sup>29</sup> Patients in this study had undergone open pancreas surgery; Whipple (pancreatoduodenectomy), distal pancreatectomy or total pancreatectomy. The age of the participants ranged between 56 and 74 years (mean 67 years). All participants had previously undergone surgery and one participant had oral pain treatment for chronic pain problems, neither were related to the pancreas cancer, see Table 1 for the participants characteristics. The routine for patients undergoing pancreas surgery is staying overnight at the Post Anesthetic Care Unit (PACU) before being transferred to the Intermediate Care Unit (IMCU). After a few days at the IMCU, patients are transferred to a regular ward where epidural pain treatment is shifted to oral pain treatment, that is,

**Table 1**  
Characteristics of the Participants

Participant	Age	Male/Female	Previous Surgery Yes/No	Long Lasting Pain Before Surgery Yes/No
1	72	M	Yes	No
2	61	F	Yes	No
3	67	M	Yes	No
4	74	M	Yes	No
5	63	F	Yes	No
6	71	F	Yes	No
7	56	F	Yes	Yes (chronic back pain)
8	74	M	Yes	No
9	69	F	Yes	No
10	62	M	Yes	No
11	68	M	Yes	No
12	72	M	Yes	No

opioid tablets on day 4 to 5. The participants in this study had epidural pain treatment for 3 to 8 days, with mean value of 4, 5 days.

**Data Collection**

The interviews were carried out between April and October 2015. The interviews took place in the afternoon in an undisturbed environment when the patient was resting on the bed alone in their room, at the regular ward, 1 to 2 days after the epidural was turned off, so that the patients would have as fresh a memory as possible. The interviews lasted between 15 and 40 minutes (mean 20) and were conducted by the first author, digitally recorded, and transcribed verbatim. Each interview began with the same open question, “Would you please describe how you experience your pain treatment after surgery until today.” Follow-up questions were supported by a semi-structured interview guide<sup>29,30</sup> focusing on pain and pain treatment, for example do you have any experience of pain associated with previous operations, can you tell me how you experienced having the continuous epidural pain treatment, and can you tell me about the time after the shutdown. After 10 interviews, no new information was obtained and after the 12th interview, the data collection was stopped, indicating information power.<sup>31</sup>

**Analysis and Rigor**

The analysis was conducted according to Graneheim et al.<sup>28</sup> The qualitative content analysis started with the first author listening to the interviews and writing individual memos, followed by the three authors reading all the transcripts several times to get a sense of the whole. Meaning units were identified and condensed. The condensed meaning units were coded, and the codes were discussed between the three researchers and confirmed. The analysis then continued by repeatedly going through and interpreting the content, from codes, meaning units and condensed meaning units to the whole text. Categories were created, re-examined, re-organized, compared and confirmed, and finally two sub-themes and one theme were created. An example of the analysis process is provided in Table 2.

To increase the trustworthiness, the data collection, analysis, and presentation of the results involved a continuous process of discussions among the three authors in the research group. The first author is an intensive care and pain management nurse working in a Post Anesthetic Care Unit (PACU). The second and third author are both intensive care nurses and have extensive knowledge and experience

of qualitative research and qualitative content analysis. The authors were guided by the Standard for Reporting Qualitative Research checklist, reporting the qualitative research study (supplementary file 1).

**Ethical Consideration**

The study was approved by the Regional Ethical Review Board in Stockholm (2015/20–31). Before starting each interview, participants gave written informed consent. The participants were informed that participation in the study was voluntary, and that the participant could cancel the interview at any time or choose not to answer some questions without any consequences for their future treatment. None of the researchers were involved in the care of the participants at any time. No compensation was given for participation. All data were stored on protected servers accessible only to researchers involved in the project.

**Results**

The analysis of the participants experiences resulted in one theme (1) Maintaining a sense of control in the perioperative phase and two sub-themes (i) Sense of vulnerability and safety and (ii) Sense of comfort and discomfort (Table 3).

*Maintaining a Sense of Control in the Perioperative Phase*

The transition from epidural to oral pain treatment was stressful, and some participants experienced severe pain. Their pain perception and intensity were influenced by previous experiences and by their expectations. The participants wanted to maintain a sense of control. The pain and discomfort affected the individuals throughout the perioperative phase, and they expressed a loss of control having to rely on the staff’s competence and supportive actions for regaining and maintaining control. Concerns about future health problems, such as waiting for the response from the cytological examination after the surgery and adapting to insulin requirements after discharge, also affected their experience. When patients had difficulty maintaining a sense of control, anxiety intensified the pain experiences.

*Sense of Vulnerability and Safety*

The sub-theme, Sense of vulnerability and safety, includes the categories, (i) Vulnerability and safety during the preoperative catheter

**Table 2**  
Example of Analysis Process

Theme	Sub-themes	Category	Codes	Condensed Meaning Units	Meaning Units
Maintaining a sense of control in the perioperative phase	Sense of vulnerability and safety	Vulnerability and safety during the preoperative catheter insertion	Loss of control	Obviously, this is a strange environment, lying there sideways and they took quite some time. One has no control, and one is used to having control and the insecurity becomes greater.	Obviously, this is a strange environment, I don’t know, lying there sideways and they took quite some time to put it in. One has no control, and one is used to having control and the insecurity becomes greater.

**Table 3**  
Result

Theme	Sub-theme	Category
Maintaining a sense of control in the perioperative phase	Sense of vulnerability and safety	Vulnerability and safety during the preoperative catheter insertion Vulnerability and safety in the nursing care relationship Vulnerability and safety in the environment
	Sense of comfort and discomfort	Sense of comfort provided by effective pain treatment Sense of discomfort caused by ineffective pain treatment

insertion, (ii) Vulnerability and safety in the nursing care relationship, and (iii) Vulnerability and safety in the postoperative environment.

**Vulnerability and Safety During the Preoperative Catheter Insertion.** The participants' feelings of vulnerability and safety varied and were related to the participants' sense of control. When the epidural catheter was inserted, participants experienced different sensations. Participants expressed feeling vulnerable and unsafe in varying degrees, to feeling safe and being in control. The feeling of being vulnerable and unsafe intensified their pain experience. Several participants expressed that they did not have enough information about the procedure, both how it would feel when the catheter was inserted and afterwards. The insertion of the epidural catheter was experienced as painful by some participants, while others did not feel any pain at all.

*"Obviously, this is a strange environment. Lying there sideways and they took quite some time. One has no control, and one is used to having control and the insecurity becomes greater."*

(Participant 9, 69 years, woman)

Previous experiences that also affected the participants to varying degrees of feeling vulnerable and safe was as related to concerns about the catheter causing damages.

*"I was an opponent at first just due to bad experience, worried about getting an epidural when it failed earlier. It was difficult to get in between the vertebrae on the third attempt, it succeeded but no pain occurred as I was given local anesthesia."*

(Participant 11, 68 years, man)

**Vulnerability and Safety in the Nursing Care Relationship.** The participants' sense of vulnerability and safety in relation to nursing care varied but was affected by how they were treated by the nurse throughout the whole perioperative period. When the nursing care relationship was unsatisfactory, participants felt vulnerable. When participants needed additional pain medication, they sometimes had to wait too long before it was administered, which made them feel vulnerable and unsafe. Some participants felt that they were not allowed to ask for extra medication and some participants expressed that they felt ignored by the nurse by having to wait too long for extra pain medication after the epidural pain treatment was stopped. When not being given pain treatment in time, the participants had to try to divert their pain on their own, for example, by watching films. This did not help, and severe pain arose.

*"I did not feel welcome to ask for anything unnecessarily. We have an extremely ill patient to take care of, so I felt a bit snubbed. I then watched a film, but it was not effective. I lay for five hours and had terrible pain without a second sleep and then five hours is a long time. You then concentrate on surviving."*

(Participant 1, 72 years, man)

Participants were told by nurses to notify them before the pain became too strong and the nurses gave hope that the pain would decrease over time, which was perceived as calming by the participants.

*"A truly kind nurse gave pain relief. I got extra all the time if you have pain, you will get it."*(Participant 5, 63 years, woman)

**Vulnerability and Safety in the Environment.** The environment at the ward was experienced as both unsafe and safe by the participants. Factors that made the environment unsafe was a feeling of the ward

being disorganized, which led to them feeling a loss of control over their situation. It felt awkward to be cared for in an unsettled care environment, with staff around 24 hours a day. Participants also sensed that staff were sometimes stressed due to a large workload leading to shortcomings in communication. During nights, the participant felt even more vulnerable since it was more difficult to manage the pain and they sometimes had to wait a long time for extra pain medication. Maintaining a sense of control was especially important during the night when time passed slowly. The participants' sleep was also affected by the noises and alarms from the infusion pumps which awoke them during the night.

*"Devices that peep every second hour, and you jump right up in bed, you wake up, it peeped like hell, before they turned it off."*

(Participant 4, 74 years, man)

Having relatives visiting as well as having your own private room made the healthcare environment feeling safer.

*"I open the window listening to the birds hear a small thrush. You must look after those little things. I'm probably a solitaire and that's nice."*

(Participant 2, 61 years, woman)

#### Sense of Comfort and Discomfort

The sub-theme Sense of comfort and discomfort includes the categories, (i) Sense of comfort provided by effective pain treatment (ii) Sense of discomfort caused by ineffective pain treatment.

**Sense of Comfort Provided by Effective Pain Treatment.** When the epidural pain treatment was effective, participants felt a sense of comfort. Some of the participants described that to their surprise, they woke up after surgery without experiencing pain and they felt alert.

*"Almost strange when I woke up at Postop (Post Anaesthetic Care Unit), I had no pain at all. (Participant 2, 61 years, woman)"*

For those participants that the epidural pain treatment worked well, it continued uninterrupted until it was time to shift pain treatment from epidural to oral pain treatment. After the pain treatment had shifted, participants understood how effective their epidural pain treatment had been since they had been able to move unhindered. Participants described that when the sensation of the operated area returned, they became more careful during mobilization.

*"When the epidural releases completely, you feel that it hurts when you bend. With the epidural I did not feel that. This is good because then I'm careful when I bend over."*

(Participants 10, 62 years, man)

**Sense of Discomfort Caused by Ineffective Pain Treatment.** Participants describe discomfort to varying degrees, and that pain is subjective. Some participants described discomfort during the first post-operative days which was mainly related to ineffective pain treatment. The pain treatment could be ineffective due to problems with the epidural catheter, for example, leakage leading to an insufficient anesthetic effect, something that also led to a fear of needing to have a new epidural catheter. Participants also described that their anxiety and discomfort could be alleviated by the nurse's bedside manners.

*"When I woke up, I had very much pain. The night nurse was calm and confident, that is why I dared to try again and then came the"*

doctor and put a new epidural catheter in and everything was perfect.”

(Participant 7, 56 years, woman)

Another source for discomfort for the participants was caused by the drugs distributed during the epidural pain treatment, which to a varying degree, could have a negative impact on the body. The experience of itching, for example, was described as something that could be relieved by drugs. However, these drugs have the side-effect of causing fatigue. Paralysis from the waist down, with a larger area having a loss of sensation of the body than necessary was also something that provided discomfort to a varying degree among the participants.

“When I woke up it turned out that I was paralyzed from the waist downwards and then they directly lowered the speed of the pump. It was a scary feeling because you have heard about side effects when people get completely paralyzed. . . but it disappeared.”

(Participant 10, 62 years, man)

Discomfort was experienced by the participants when it was time to shift from epidural pain treatment to oral pain treatment. Some participants described that they believed the transition to work without problems, while others worried about getting increased pain. Routinely, oral pain treatment, that is, opioids and Acetaminophen are given before the epidural pain treatment is decreased. The pain intensity after the epidural pain treatment was finalized varied, from being almost unnoticed for some while others experienced severe pain. Some participants described severe pain breakthrough when pain treatment regimen was not followed. However, not all participants had clear memories transitioning from epidural pain treatment to oral pain treatment.

While pain was described by most participants, some of them also described that 1 hour after the epidural pain pump was turned off, not only did the intensity of the pain increase, but colic pain arose. However, most of the participants described increased discomfort related to pain during the first day before the oral pain treatment had full effect. For those participants that had pain breakthrough, they often blamed themselves for not informing the nurse in time when the pain increased, describing their wish to have kept the epidural pain treatment for a longer period of time as it worked well.

“When they removed the epidural, it was as it would go a stone-breaker through the chest, just like crash, crash, crash”

(Participant 2, 61 years, woman)

After changing pain treatment from epidural to oral, participants experienced discomfort in the form of nausea and sometimes the participants experienced nausea to be worse than the pain itself. Participants also described nausea as being exhausting which led to an inability to participate in conversations or take in information. Retching before vomiting gave fear that the surgical wound would be damaged, and nausea or vomiting could occur without warning.

“I have the pain under control but not the nausea.”

(Participant 6, 71 years, man)

Participants also described a loss of appetite to a varying degree after transitioning from epidural pain treatment to oral pain treatment and it was a struggle to consume both fluids and food.

“When you feel the sickest and you must eat, life is on the limit of being unbearable.”

(Participant 10, 62 years, man)

The stories told by the participants revealed various degrees of fatigue after transitioning to oral pain treatment. Not only could the transition lead to discomfort but also the oral pain treatment itself that is, the opioid tablets, could lead to discomfort in varying degrees. For example, participants described both hallucinations and lack of concentration by bolus doses of intravenous morphine when the oral pain treatment did not provide adequate pain relief.

“The ability to concentrate is impaired by the morphine tablets. If you read a book, you easily lose focus.”

(Participant 12, 72 years, man)

## Discussion

Exploring experiences of pain treatment after pancreas surgery entails identifying the core content between the participants in the study, but also acknowledging variations. Kolcaba<sup>26</sup> has developed the Theory of Comfort and by applying the theory to our results, it is evident that the participants were on a continuum between discomfort and comfort and between being vulnerable and safe. Maintaining a sense of control was at the core and difficulties maintaining control intensified their pain experiences but also their vulnerability and discomfort. Kolcaba<sup>26</sup> emphasizes that pain is discomfort, and when in pain, the participants need comfort care. An underlying assumption about comfort care is that each person has a holistic response to complex stimuli and in the current study, it is suggested that the goal for comfort care can be to support the patients moving on the continuum from discomfort toward comfort.

Kolcaba<sup>32</sup> suggests that there are four contexts of comfort to assess and intervene as a nurse: physical, psychospiritual, environmental, and sociocultural. In each of these contexts, nursing care aims to relieve, ease, and support the patient. In the physical context, patients can have different experiences and sensations, for example, symptoms and signs, like pain. Many participants in our study woke up quickly after surgery without pain. However, some participants experienced other problems, for example, numb legs, itching, and discomfort caused by the catheter in the back. Loss of mobility has previously been described where epidural pain treatment was associated with a loss of control together with numbness of the legs that restricted mobility and caused anxiety,<sup>33</sup> leading to discomfort.

Participants described a fear of increased pain when it was time to terminate the epidural pain treatment. The transition from epidural to oral pain treatment was a critical point in the pain treatment regime and the participants' experiences differed. Participants transitioned from comfort to discomfort as the transition was both painful and stressful. Relieving the discomfort caused by pain entails supporting the patient moving from discomfort toward comfort. While some participants did not notice when the epidural pain treatment was stopped, others described an unbearable pain that was not even treatable with intravenous morphine and the epidural pain treatment had to be re-started. The uncontrolled, severe pain, in the first 2 days after pancreas surgery has previously been described by Patel et al,<sup>34</sup> when the epidural did not anesthetize properly. Another study showed higher mean pain scores and more patients reported unacceptable pain after the epidural pain treatment was terminated, which led to the need for liberal administration of supplemental opioids.<sup>21</sup> When starting to take opioid tablets, the participants became nauseated with no appetite and a crippling fatigue. Galli et al<sup>35</sup> showed similar results when patients suffered a lot of pain and



nausea after pancreas surgery and required a longer recovery and hospital stay. These postoperative symptoms prominent in the aftermath of pancreas surgery leads to poor well-being.<sup>36,37</sup> Difficulties concentrating has previously been described by patients transitioning from epidural pain treatment to oral pain treatment,<sup>33</sup> and these side-effects were also described by participants in this study. Some of the participants expressed that they preferred feeling pain rather than drugged. One solution could be to use a complementary method, for example, TENS (Transcutaneous Electrical Nerve Stimulation) which if started 2–4 hours before the epidural pain treatment is turned off, tends to reduce the need for opioids.<sup>18</sup>

The psychospiritual context manifests as fear, and to reduce fear and the feeling of vulnerability in this context, a blanket can be laid on the exposed body part, making the patient feeling more comfortable.<sup>38</sup> Bergström et al<sup>25</sup> suggested that nurses need to mediate and secure the atmosphere as a part of psychospiritual comfort. In the present study, this also manifested when nurses gave hope to the participants that pain would decrease over time and the participants were urged to tell the nurse before the pain intensity became too strong. This highlights the importance of seeing each person and the cooperation between caregiver and patient to perceive good health.<sup>39</sup>

The feeling of vulnerability occurred when the participants had difficulty maintaining a sense of control, and their anxiety intensified their pain experience. The same result, feelings of worry, loss of control, vulnerability and dependence on staff were described by Forsberg et al.<sup>40</sup> A negative preoperative experience is a significant predictor for acute postsurgical pain intensity and the strongest predictor of catastrophic pain.<sup>41</sup> To ease and relieve postoperative anxiety is central to facilitating overall patient comfort, manageable pain, and perception of wellness.<sup>42</sup>

Kolcaba<sup>26</sup> describes the environmental context of comfort where impressions like sounds and touch affect the senses. Vulnerability and discomfort due to the unsettled perioperative environment as described by Gustafsson et al.<sup>43</sup> was also described by the participants in our study as a reason for discomfort, for example, distracting alarms, staff, and monitoring equipment. Vulnerability, related to the physical environment has both negative and positives effect on patient's well-being,<sup>44</sup> Clark et al<sup>45</sup> showed that it is essential to provide a proactive, targeted approach for identifying psychological distress and discomfort. The participants in this study also felt vulnerable in the nursing care relationship when they had to wait for pain treatment, especially during the night when the participants had difficulties distracting themselves, and they felt discomfort. Eriksson et al<sup>39</sup> also found that patients used self-care and distraction to avoid or endure pain on their own, refraining from contacting the staff due to their workload.

In the sociocultural context, reassurance is an important nursing intervention to meet the patient's comfort needs.<sup>25,26</sup> It is important that the information is relatable and understandable, to be supportive and reassuring, and by that, providing comfort to the patient.<sup>25</sup> Pancreas cancer is a life-threatening disease and patients being diagnosed with the disease have an extensive need for information, whether the disease is treatable or not. The participants in our study, expressed feeling vulnerable and unsafe in varying degrees to feeling safe and being in control. To maintain a sense of control in the perioperative phase, patients need to be more prepared for surgery as pancreas patients show a significant psychological burden related to their condition and to preoperative anxiety.<sup>46</sup> A good example of preparation is a one-session psychological intervention, by using emotional support and mindfulness techniques. This results in a significant reduction in preoperative emotional distress and less emotional pain perception after surgery.<sup>47</sup> Several participants expressed that they did not have enough information about the procedure, and how it would feel when the catheter was inserted as well as

afterwards. The participants in our study experienced vulnerability when the nursing care relationship was unsatisfactory, which led to discomfort.

Kolcaba<sup>26</sup> suggests that transcendence entails the individual rising above symptoms to find strength. The participants in our study maintained a sense of control when they experienced that anxiety and pain was under control regardless of pain treatment method. They accepted fatigue if comfort and pain relief was satisfactory. Comfort is more than the absence of pain and can be enhanced, even when pain cannot be fully treated. Enhanced comfort entails increased hope and confidence by nurses assuring patients that they can recover, are safe, and are protected from harm.<sup>42</sup> Nurses need, through their action, to support the patient to endure and manage what cannot be avoided. In our study, maintaining a sense of control in the postoperative phase seemed to offer the patients strength, and together with actions to ease (be calm and satisfied), and when their needs were met, that is relieved, they moved on the continuum from being vulnerable to being safe, and as Kolcaba suggests, toward a state of comfort. Vulnerability is caused by various reasons and was described by the participants in our study as struggling to maintain control. Kolcaba and Wilson<sup>42</sup> have described the feeling of vulnerability as losing control when putting your life in the hands of others and feelings of vulnerability can be caused by discomfort.

### Limitations

A limitation in this study is that participants who did not receive epidural pain treatment was excluded and therefore, their pain experience was not captured in this study. Another limitation could be the age of the participants, on an average 67 years of age. The outcome may have been different with younger participants. However, pancreas cancer is a disease most common among persons older than 55 years of age, which suggest that the participants in this study reflect the patient group relatively well.

### Conclusion

The participants experienced comfort after pancreas surgery if they maintained a sense of control in the perioperative phase and when the epidural pain treatment provided pain relief without any side effects. The transition from epidural pain treatment to oral pain treatment with opioid tablets was experienced individually, from an almost unnoticed transition to the experience of severe pain, nausea, and fatigue. The sense of vulnerability and safety among the participants were affected by the nursing care relationship and the environment at the ward.

### Acknowledgments

The authors would like to thank all the patients who participated in this study. The authors also thank Birgitta Holmgren, research nurse who helped us providing written information to prospective participants.

### Supplementary materials

Supplementary material associated with this article can be found in the online version at [doi:10.1016/j.japan.2022.06.007](https://doi.org/10.1016/j.japan.2022.06.007).

### References

- Brennan F, Lohman D, Gwyther L. Access to pain management as a human right. *Am J Public Health*. 2019;109(1):61–65. <https://doi.org/10.2105/AJPH.2018.304743>.
- Chou R, Gordon DB, de Leon-Casasola OA, et al. Management of postoperative pain: a clinical practice guideline from the American Pain Society, the American Society of Regional Anesthesia and Pain Medicine, and the American

- Society of Anesthesiologists' Committee on Regional Anesthesia, Executive Committee, and Administrative Council. *J Pain*. 2016;17(2):131–157. <https://doi.org/10.1016/j.jpain.2015.12.008>.
3. Richebe P, Capdevila X, Rivat C. Persistent postsurgical pain: pathophysiology and preventative pharmacologic considerations. *Anesthesiology*. 2018;129(3):590–607. <https://doi.org/10.1097/ALN.0000000000002238>.
  4. Kaye AD, Chernobylsky DJ, Thakur P, et al. Dexmedetomidine in enhanced recovery after surgery (ERAS) protocols for postoperative pain. *Curr Pain Headache Rep*. 2020;24(5):21. <https://doi.org/10.1007/s11916-020-00853-z>.
  5. National Board of Health and Welfare. National cancer register. Accessed May 3, 2022. <https://www.socialstyrelsen.se/globalassets/sharepoint-dokument/artikelkatalog/statistik/2020-12-7133.pdf>.
  6. Ilic M, Ilic I. Epidemiology of pancreatic cancer. *World J Gastroenterol*. 2016;22(44):9694–9705. <https://doi.org/10.3748/wjg.v22.i44.9694>.
  7. Neoptolemos JP, Moore MJ, Cox TF, et al. Effect of adjuvant chemotherapy with fluorouracil plus folinic acid or gemcitabine vs observation on survival in patients with resected periampullary adenocarcinoma: The ESPAC-3 periampullary cancer randomized trial. *JAMA*. 2012;308(2):147–156. <https://doi.org/10.1001/jama.2012.7352>.
  8. Tung S, Davis LE, Hallett J, et al. Population-level symptom assessment following pancreaticoduodenectomy for adenocarcinoma. *JAMA Surg*. 2019;154(11):e193348. <https://doi.org/10.1001/jamasurg.2019.3348>.
  9. Fric P, Sedo A, Skrha J, et al. Early detection of sporadic pancreatic cancer: time for change. *Eur J Gastroenterol Hepatol*. 2017;29(8):885–891. <https://doi.org/10.1097/MEG.0000000000000904>.
  10. American Cancer Society. Surgery for pancreatic cancer. 2021. Accessed May 3, 2022. <https://www.cancer.org/cancer/pancreatic-cancer/treating/surgery.html>.
  11. Yang MMH, Hartley RL, Leung AA, et al. Preoperative predictors of poor acute postoperative pain control: a systematic review and meta-analysis. *BMJ Open*. 2019;9(4):e025091. <https://doi.org/10.1136/bmjopen-2018-025091>.
  12. Oderda GM, Gan TJ, Johnson BH, Robinson SB. Effect of opioid-related adverse events on outcomes in selected surgical patients. *J Pain Palliat Care Pharmacother*. 2013;27(1):62–70. <https://doi.org/10.3109/15360288.2012.751956>.
  13. International Association for the Study of Pain. Management of Postsurgical Pain in Adults. The European Pain Federation. Accessed May 3, 2022. <https://www.europeanpainfederation.eu/wp-content/uploads/2017/01/05.-Management-of-Postsurgical-Pain-Management.pdf>.
  14. Pak LM, Haroutounian S, Hawkins WC, et al. Epidurals in Pancreatic Resection Outcomes (E-PRO) study: protocol for a randomised controlled trial. *BMJ Open*. 2018;8(1):e018787. <https://doi.org/10.1136/bmjopen-2017-018787>.
  15. Bajwa SJ, Anand S, Kaur G. Anesthesia and cancer recurrences: the current knowledge and evidence. *J Cancer Res Ther*. 2015;11(3):528–534. <https://doi.org/10.4103/0973-1482.157321>.
  16. Byrne K, Levins KJ, Buggy DJ. Can anesthetic-analgesic technique during primary cancer surgery affect recurrence or metastasis? *Can J Anaesth*. 2016;63(2):184–192. <https://doi.org/10.1007/s12630-015-0523-8>.
  17. Kim R. Effects of surgery and anesthetic choice on immunosuppression and cancer recurrence. *J Transl Med*. 2018;16(1):8. <https://doi.org/10.1186/s12967-018-1389-7>.
  18. Bjersa K, Andersson T. High frequency TENS as a complement for pain relief in postoperative transition from epidural to general analgesia after pancreatic resection. *Complement Ther Clin Pract*. 2014;20(1):5–10. <https://doi.org/10.1016/j.ctcp.2013.11.004>.
  19. Golster M. Seven years of patient-controlled epidural analgesia in a Swedish hospital: a prospective survey. *Eur J Anaesthesiol*. 2014;31(11):589–596. <https://doi.org/10.1097/EJA.000000000000105>.
  20. Popping DM, Elia N, Van Aken HK, et al. Impact of epidural analgesia on mortality and morbidity after surgery: systematic review and meta-analysis of randomized controlled trials. *Ann Surg*. 2014;259(6):1056–1067. <https://doi.org/10.1097/SLA.0000000000000237>.
  21. Groen JV, Slotboom DEF, Vuyk J, et al. Epidural and non-epidural analgesia in patients undergoing open pancreatectomy: a retrospective cohort study. *J Gastrointest Surg*. 2019;23(12):2439–2448. <https://doi.org/10.1007/s11605-019-04136-w>.
  22. Wensley C, Botti M, McKillop A, Merry AF. Maximising comfort: How do patients describe the care that matters? A two-stage qualitative descriptive study to develop a quality improvement framework for comfort-related care in inpatient settings. *BMJ Open*. 2020;10(5):e033336. <https://doi.org/10.1136/bmjopen-2019-033336>.
  23. Wensley C, Botti M, McKillop A, Merry AF. A framework of comfort for practice: an integrative review identifying the multiple influences on patients' experience of comfort in healthcare settings. *Int J Qual Health Care*. 2017;29(2):151–162. <https://doi.org/10.1093/intqhc/mzw158>.
  24. Robleda G, Banos JE. Health care professionals' assessment of patient discomfort after abdominal surgery. *J Perianesth Nurs*. 2021;36(5):553–558. <https://doi.org/10.1016/j.jopan.2020.11.007>.
  25. Bergstrom A, Hakansson A, Warren Stomberg M, Bjersa K. Comfort theory in practice—nurse anesthetists' comfort measures and interventions in a preoperative context. *J Perianesth Nurs*. 2018;33(2):162–171. <https://doi.org/10.1016/j.jopan.2016.07.004>.
  26. Kolcaba K. *Comfort Theory and Practice: A Vision for Holistic Health and Research*. New York: NY: Springer Pub; 2003.
  27. Wilson L, Kolcaba K. Practical application of comfort theory in the perianesthesia setting. *J Perianesth Nurs*. 2004;19(3):164–173. <https://doi.org/10.1016/j.jopan.2004.03.006>. quiz 171–3.
  28. Graneheim UH, Lindgren BM, Lundman B. Methodological challenges in qualitative content analysis: a discussion paper. *Nurse Educ Today*. 2017;56:29–34. <https://doi.org/10.1016/j.nedt.2017.06.002>.
  29. Polit DB, Beck CT. *Nursing Research Generating and Assessing Evidence for Nursing Practice*. 11th Philadelphia: Wolters Kluwer; 2020.
  30. Kvale S, Bringsmann S. *InterViews. Learning the Craft of Qualitative Research Interviewing (in Swedish)*. Lund: Studentlitteratur; 2014.
  31. Malterud K, Siersma VD, Guassora AD. Sample size in qualitative interview studies: guided by information power. *Qual Health Res*. 2016;26(13):1753–1760. <https://doi.org/10.1177/1049732315617444>.
  32. Kolcaba K. Evolution of the mid range theory of comfort for outcomes research. *Nurs Outlook*. 2001;49(2):86–92. <https://doi.org/10.1067/mno.2001.110268>.
  33. Worster B, Holmes S. A phenomenological study of the postoperative experiences of patients undergoing surgery for colorectal cancer. *Eur J Oncol Nurs*. 2009;13(5):315–322. <https://doi.org/10.1016/j.ejon.2009.04.008>.
  34. Patel A, Stasiowska M, Waheed U, Brett SJ, Patel PB. Poor analgesic efficacy of epidural analgesia in critical care patients after pancreaticoduodenectomy. *Pancreas*. 2014;43(3):373–379. <https://doi.org/10.1097/MPA.0000000000000031>.
  35. Galli E, Fagnani C, Laurora I, et al. Enhanced recovery after surgery (ERAS) multimodal programme as experienced by pancreatic surgery patients: findings from an Italian qualitative study. *Int J Surg*. 2015;23(Pt A):152–159. <https://doi.org/10.1016/j.ijsu.2015.09.071>.
  36. Burrell SA, Yeo TP, Smeltzer SC, et al. Symptom clusters in patients with pancreatic cancer undergoing surgical resection: Part II. *Oncol Nurs Forum*. 2018;45(4):E53–E66. <https://doi.org/10.1188/18.ONF.E53-E66>.
  37. Gustavell T, Sundberg K, Frank C, et al. Symptoms and self-care following pancreaticoduodenectomy: perspectives from patients and healthcare professionals – Foundation for an interactive ICT application. *Eur J Oncol Nurs*. 2017;26:36–41. <https://doi.org/10.1016/j.ejon.2016.12.002>.
  38. Seyedfatemi N, Rafii F, Rezaei M, Kolcaba K. Comfort and hope in the preanesthesia stage in patients undergoing surgery. *J Perianesth Nurs*. 2014;29(3):213–220. <https://doi.org/10.1016/j.jopan.2013.05.018>.
  39. Eriksson K, Wikstrom L, Fridlund B, Arestedt K, Brostrom A. Patients' experiences and actions when describing pain after surgery—a critical incident technique analysis. *Int J Nurs Stud*. 2016;56:27–36. <https://doi.org/10.1016/j.ijnurstu.2015.12.008>.
  40. Forsberg A, Engstrom A, Soderberg S. From reaching the end of the road to a new lighter life – people's experiences of undergoing gastric bypass surgery. *Intensive Crit Care Nurs*. 2014;30(2):93–100. <https://doi.org/10.1016/j.iccn.2013.08.006>.
  41. Sobol-Kwapinska M, Plotek W, Babel P, et al. Time perspective as a predictor of acute postsurgical pain and coping with pain following abdominal surgery. *Eur J Pain*. 2017;21(4):635–644. <https://doi.org/10.1002/ejp.967>.
  42. Kolcaba K, Wilson L. Comfort care: a framework for perianesthesia nursing. *J Perianesth Nurs*. 2002;17(2):102–111. <https://doi.org/10.1053/jpan.2002.31657>. quiz 111–3.
  43. Gustafsson IL, Rask M, Schildmeijer K, Elmqvist C. Patients experience of warmth and coldness in connection with surgery – a phenomenological study. *Int J Qual Stud Health Well-being*. 2021;16(1): 1858540. <https://doi.org/10.1080/17482631.2020.1858540>.
  44. Gill SD, Dunning T, McKinnon F, Cook D, Bourke J. Understanding the experience of inpatient rehabilitation: Insights into patient-centred care from patients and family members. *Scand J Caring Sci*. 2014;28(2):264–272. <https://doi.org/10.1111/scs.12055>.
  45. Clark KL, Loscalzo M, Trask PC, Zabora J, Philip EJ. Psychological distress in patients with pancreatic cancer—an understudied group. *Psychooncology*. 2010;19(12):1313–1320. <https://doi.org/10.1002/pon.1697>.
  46. Hallett J, Davis LE, Mahar AL, et al. Patterns of symptoms burden in neuroendocrine tumors: a population-based analysis of prospective patient-reported outcomes. *Oncologist*. 2019;24(10):1384–1394. <https://doi.org/10.1634/theoncologist.2019-0112>.
  47. Marinelli V, Danzi OP, Mazzi MA, et al. PREPARE: PreOperative Anxiety REDuction. One-year feasibility RCT on a brief psychological intervention for pancreatic cancer patients prior to major surgery. *Front Psychol*. 2020;11:362. <https://doi.org/10.3389/fpsyg.2020.00362>.

**Supplementary file 1**

Standards for reporting qualitative research: SRQR

	Page	Reporting Item
<b>Title</b>		
#1	p. 1	Concise description of the nature and topic of the study identifying the study as qualitative or indicating the approach (e.g. ethnography, grounded theory) or data collection methods (e.g. interview, focus group) is recommended
<b>Abstract</b>		
#2	p. 1	Summary of the key elements of the study using the abstract format of the intended publication; typically includes background, purpose, methods, results and conclusions
<b>Introduction</b>		
Problem formulation	p. 4	Description and significance of the problem / phenomenon studied: review of relevant theory and empirical work; problem statement
#3		
Purpose or research question	p. 5	Purpose of the study and specific objectives or questions
#4		
<b>Methods</b>		
Qualitative approach and research paradigm	p. 5	Qualitative approach (e.g., ethnography, grounded theory, case study, phenomenology, narrative research) and guiding theory if appropriate; identifying the research paradigm (e.g., postpositivist, constructivist / interpretivist) is also recommended; rationale. The rationale should briefly discuss the justification for choosing that theory, approach, method or technique rather than other options available; the assumptions and limitations implicit in those choices and how those choices influence study conclusions and transferability. As appropriate the rationale for several items might be discussed together.
#5		
Researcher characteristics and reflexivity	p. 5	Researchers' characteristics that may influence the research, including personal attributes, qualifications / experience, relationship with participants, assumptions and / or presuppositions; potential or actual interaction between researchers' characteristics and the research questions, approach, methods, results and / or transferability
#6	p. 8	
Context	p. 5 – p. 6	Setting / site and salient contextual factors; rationale
#7		
Sampling strategy	p. 5	How and why research participants, documents, or events were selected; criteria for deciding when no further sampling was necessary (e.g. sampling saturation); rationale
#8	and 7	
Ethical issues pertaining to human subjects	p. 8	Documentation of approval by an appropriate ethics review board and participant consent, or explanation for lack thereof; other confidentiality and data security issues
#9		
Data collection methods	p.6-7	Types of data collected; details of data collection procedures including (as appropriate) start and stop dates of data collection and analysis, iterative process, triangulation of sources / methods, and modification of procedures in response to evolving study findings; rationale
#10		
Data collection instruments and technologies	p. 6-7	Description of instruments (e.g., interview guides, questionnaires) and devices (e.g., audio recorders) used for data collection: if / how the instruments(s) changed over the course of the study
#11		
Units of study	p.5-6	Number and relevant characteristics of participants, documents, or events included in the study; level of participation (could be reported in results)
#12		
Data processing	p. 7	Methods for processing data prior to and during analysis, including transcription, data entry, data management and security, verification of data integrity, data coding, and anonymisation / deidentification of excerpts
#13		
Data analysis	p. 7-8	Process by which inferences, themes, etc. were identified and developed, including the researchers involved in data analysis; usually references a specific paradigm or approach; rationale
#14		
Techniques to enhance trustworthiness	p. 8	Techniques to enhance trustworthiness and credibility of data analysis (e.g. member checking, audit trail, triangulation); rationale
#15		
<b>Results/findings</b>		
Syntheses and interpretation	p. 8 - p. 16	Main findings (e.g. interpretations, inferences, and themes); might include development of a theory or model, or integration with prior research or theory
#16		
Links to empirical data	p. 8 - p. 16	Evidence (e.g. quotes, field notes, text excerpts, photographs) to substantiate analytic findings
#17		
<b>Discussion</b>		
Intergration with prior work, implications, transferability and contribution(s) to the field	p. 17 - p. 21	Short summary of main findings; explanation of how findings and conclusions connect to, support, elaborate on, or challenge conclusions of earlier scholarship; discussion of scope of application / generalizability; identification of unique contributions(s) to scholarship in a discipline or field
#18		
Limitations	p. 21	Trustworthiness and limitations of findings
#19		
<b>Other</b>		
Conflicts of interest	None as stated	Potential sources of influence of perceived influence on study conduct and conclusions; how these were managed
#20		
Funding	None as stated	Sources of funding and other support; role of funders in data collection, interpretation and reporting
#21		