IMPACT OF MENTHAL REPRESENTATION OF DISEASE AND WOUND-RELATED SUBJECTIVE PERCEPTION OF DISEASE ON CONVALESCENCE AFTER SURGICAL TREATMENT*

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Compared to open surgery, laparoscopic treatment has been shown to have several advantages, including lower levels of postoperative pain, faster recovery, and better cosmetic results. Nevertheless, the advantages of laparoscopy are being debated as possibly not being merely related to biomedical factors.

Material and methods. The study consisted of two sub-studies. In the first study, 150 healthy, previously unoperated volunteers, not employed in the health services, were included. Healthy volunteers, from the latter study, were given questionnaires that presented different sizes of post-operative wounds and examined their perception of the severity of the illnesses that were treated by surgery leading to these wounds. In the second study, data was collected from 65 laparoscopic cholecystectomy patients and 35 patients treated by the open approach cholecystectomy. Patients from the second study were examined prior to operation and 1 month after surgery with a questionnaire evaluating their subjective perception of the disease.

Results. Subjective perception of the severity of disease (SPSD) was similar between the laparoscopy and the open approach cholecystectomy patients before the operation (respectively, 6.25±1.7 and 6.06±2.2; ns). At the follow-up, a significant decrease of SPSD among laparoscopy patients was observed (post-op score = 3.28±0.8, p<0.05 in paired t-Student test), but not in the open approach patients (6.42±1.7, ns in paired t-Student test). The volunteers perceived that the disease of the laparoscopically treated patients was less serious than the disease of those treated with open surgery.

Conclusions. The authors would like to emphasize that the study presents a new approach to the explanation of the so called “laparoscopy phenomenon”, i.e. much faster and smoother recovery after relatively larger and more serious surgical procedures. We believe that the benefits observed among the videoscopy patients might be, apart from immunological and pain-related factors, attributed to the psychological influence of cognitive representations of the disease severity on pain, analgetics use, and recovery.

Key words: laparoscopy, recovery, subjective perception of the disease, wound

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Compared to open surgery, laparoscopic treatment has been shown to have several advantages, including lower levels of postoperative pain, faster recovery, and better cosmetic results (1, 2, 3). The decreased surgical trauma has been confirmed by studies of physiologic, metabolic, and biochemical responses of the body to the laparoscopic procedure (4, 5, 6). Recently, more attention has been directed towards how patients’ cognitive representations...
of their illness are associated with adjustment and rehabilitation in several medical conditions (7, 8). It has been shown that the surgical treatment might be also affected by psychological factors (9) with slower and more complicated postoperative recovery as a result (10, 11).

Human perception not only singles out symptoms but also combines them into more complex problems. Thus, people tend to create mental disease image. Information such as illness identification, its symptoms, potential causes, expected disability time and subjectively anticipated results influences cognitive image of self illness. Analyzing those elements plays a regulative role in patients life – it helps to cope with the existing situation.

One of the psychological models that attempts to explain and predict health behaviors is the Health Belief Model (HBM). The HBM was defined in four constructs representing the perceived threat and its net benefits: 1) perceived susceptibility, 2) severity, 3) benefits, and 4) barriers (12).

Therefore, could the observation of the smaller cuts influence the subjective assessment of coping with the situation of illness and increase the subjective expectation of faster recovery?

It was hypothesized that laparoscopic patients perceive their disease as less severe than patients undergoing the open surgery, even if the extent of the intraabdominal surgery was exactly the same. The same relationship was expected among the people who had never undergone any operation and never worked in a health service: a disease treated with the laparoscopic technique might be seen as less severe than the one treated with open approach surgery.

MATERIAL AND METHODS

Participants

The study consisted of two sub-studies. In the first study, data was collected from 150 healthy, previously unoperated volunteers, not working in the health services. In the second study, 65 laparoscopic cholecystectomy patients and 35 patients treated by open approach cholecystectomy were included. Background data of all groups are presented in tab. 1.

Methods of surgical intervention

The cholecystectomy was indicated in patients with symptomatic, uncomplicated gall-bladder stones. The study included only elective surgeries. Emergency cases and conversions from laparoscopic to open approach were excluded.

All the surgical procedures were performed according to the standard procedures approved by the European Association of Endoscopic Surgery (EAES). Laparoscopic cholecystectomy was performed using the standard 4 trocar approach, while the open cholecystectomies were performed using the standard approach from the right hypochondrion Kocher incision. The length of the operation and blood loss was recorded for all patients. There was no intraoperative complications or violation of standard procedure. In none of the cases enhancement of prepared area had to be undertaken. No addiction organs have been resected.

Methods of psychological evaluation

Participants of the first layer, healthy volunteers, were examined once. Participants of the second layer were examined twice: one or two days before the operation and during the follow-up visit in the out-patient clinics one month after the operation.

Participants were requested to indicate the intensity of the measured variables according to their opinion.

The Visual Analogue Scale (VAS) scaled 0-10 completed by the patients of the first layer, both before and after the surgery, followed the format presented below:

<table>
<thead>
<tr>
<th>Group</th>
<th>Mean age and standard deviation</th>
<th>Men vs female ratio</th>
<th>Education: higher/university vs primary/professional ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cholecystectomy classic n=65</td>
<td>57±7,8</td>
<td>1:2,7</td>
<td>1:2,1</td>
</tr>
<tr>
<td>Cholecystectomy laparoscopic n=35</td>
<td>54±9,2</td>
<td>1:3,1</td>
<td>1:2,3</td>
</tr>
<tr>
<td>Healthy volunteers n=150</td>
<td>47±10,2</td>
<td>1:3,3</td>
<td>1:1,9</td>
</tr>
</tbody>
</table>
1. How severe is/was my disease?
   Extreme points: “not serious at all” and “life threatening”
2. How much pain will/ did I feel after the operation?
   Extreme points: “no pain at all” and “strongest pain you can imagine”
3. Will my recovery be fast/was my recovery fast?
   Extreme points: “very fast” and “very slow”
4. How much will/did the operation impact my activity?
   Extreme points: “not at all” and “very significantly and severely”

The healthy volunteers received schemes showing the standard size and localization of the surgical wounds after videoscopic and open operations – sigmoid colon resection and cholecystectomy (fig. 1) and a VAS scaled 0-10, separately assessed for each picture:
1. How severe was the disease?
2. How much pain did the patient feel after the operation?
3. Was the recovery fast?
4. How much did the operation impact the activity of this patient?

Hospital and home convalescence were operationalized as the number of hospitalization days and home convalescence until the complete resolution of symptoms and return to full preoperative activity.

Methods of statistics analysis

The analysis was performed using STATISTICA 7.0 PL software licensed to the Medical University in Gdańsk, Poland. It included t-Student tests and ANOVA for parametric variables and Chi-square tests for non-parametric ones. Additionally, a linear multiple regression analysis has been performed to investigate the influence of illness representation on outcome measures, i.e. length of hospital stay and home convalescence in cholecystectomy patients. Input variables included age, sex, education, subjective perception of the severity of disease, post-operative pain intensity, length of the operation, and blood loss. The results were presented as an odds ration (OR) and 5% confidence interval (CI). The surgical approach was intentionally omitted. In every case p< 0.05 was considered significant.

RESULTS

Subjective perception of the severity of disease (SPSD) results were similar between laparoscopy and the open approach cholecystectomy patients before the operation (6.25 ± 1.7 and 6.06 ± 2.2; ns). At the follow-up, a significant decrease of SPSD among laparoscopy patients was observed (post-op score = 3.28 ± 0.8, p < 0.05 in paired t-Student test), but not in the open approach patients (6.42 ± 1.7, ns in paired t-Student test).

The anticipation of pain before the operation did not differ significantly between the laparoscopy and open approach cholecystectomy patients (5.24 ± 2.3 versus 5.07 ± 2.7; ns). One month after the operation, a greater decrease in pain estimates was observed among the laparoscopy patients (2.34 ± 0.7; p<0.01 in

Fig. 1. Surgical wounds schemes presented to healthy volunteers. Each of the pair represents the operation of the same curative extend but performed from different approach (A – sigmoid colon resection: O – open approach, L – laparoscopy, B – cholecystectomy: O – open approach, L – laparoscopy)
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paired t-Student test) than among the open approach (3.88 ± 1.1; p<0.05 in paired t-Student test; p<0.01 in cross section t-Student test).

As far as the speed of recovery is concerned, laparoscopic cholecystectomy patients had shorter hospital stay (2.78 days ± 1.7) than open approach ones (6.76 days ± 4.1; p<0.01) and needed a shorter period of home convalescence (38.8 days ± 6.1 versus 67.2 days ± 24.9; p<0.01).

Linear regression analysis was performed in order to obtain information on the impact of the examined variables on the length of cumulated hospital and home convalescence in cholecystectomy patients. Out of the examined data subjective perception of the severity of the disease presented highest impact on the convalescence (OR = 3.24; 95% CI 2.96-3.97). Age, sex, education, length of the operation, and blood loss did not reach statistical significance. The influence of the anticipated postoperative pain intensity was also significant but more than two-fold smaller than the influence of SPSD (OR=1.56; 95% CI 1.23-1.78). Interestingly, retrospectively evaluated pain intensity did not reach statistical predictive significance.

Healthy volunteers also perceived the disease of the laparoscopically treated patients as less serious than the disease of those treated with open surgery. Disease treated with laparoscopy was also perceived as having less impact on activity; the pain associated with the procedure was assessed as lower and recovery as faster when compared to the open approach (fig. 2)

DISCUSSION

This two-section study was undertaken to examine the effects of illness representation in particular subjective disease severity and anticipated pain on recovery. It revealed that the laparoscopic patients perceive their disease as less severe than open approach patients with regards to the same illness only because a less invasive form of treatment was instituted. The same regularity was observed among participants who have never undergone any operation and did not work in a health service – they perceived the laparoscopic approach as a treatment of a less severe health problem. Moreover, among the patients who perceived their disease as less severe, the period of convalescence was significantly shorter. Similar results were observed in the meta-analytic review of illness representation role by Hagger and Orbell (15). Weaker illness identity was connected to adaptive outcomes, such as vitality, with less attention given to side effects of the treatment (15). Moreover, among cardiac patients the perception of the disease as having major consequences on their lives was connected with slower regaining of social and domestic duties, prolonged and less effective convalescence, and longer withdrawal from sexual activities (17).

Our results confirm the significant impact of psychological factors on recovery: convalescence was proven to be factor most influenced by the subjective perception of the severity of the disease, while demographic (age, sex, education) and medical variables (length of the operation, blood loss) impacts were not statistically significant. The importance of anticipated pain, as a factor determining the convalescence time, proved to be 52% lower than the subjective perception of the disease. Thus, it was revealed that pain perception affects the patient’s convalescence in a much lower degree than the perception and the interpretation of the severity of the disease.

One of the first studies about mental illness representation was conducted in 1973-1979 by Heszen-Niejodek. Its purpose was to examine whether chronically sick people create a rep-

![Fig. 2. Perception of healthy volunteers comparing pictures of scars in laparoscopic and open approach in two different types of operation (cholecystectomy and sigmoid resection). The compares variables included: severity of the disease, postoperative pain intensity, time of recovery and impact of the surgery on the activity of the patient. * p< 0.05 in t-Student test](image)
representation of their illness. There were 350 participants with confirmed diagnosis of tuberculosis. As the results had shown, almost all of the patients created their own ideas about the causes of the illness, it’s influence on their appearance, and the way they felt. They had preconceptions about different factors that could influence their treatment, the results, and its consequences for their family and professional life (13). Interestingly, in more than 75% of the patients, the perception of the disease was inadequate to the real stage of the disease. Thus, it has been concluded that cognitive representations have a significant influence on illness experience and reaction to it (13).

According to the Illness Representation Model (15), patients create mental representations of their illness, based on the realistic and abstract sources of information (information from the doctors, internet, folk wisdom) and idiosyncratic implicit theories about health and illness in order to make sense of and to manage the actual problem they suffer from (15). Illness representation consists of five components: (I) identity (symptoms), (II) cause, (III) timeline, (IV) consequences, and (V) curability/controllability (15). Patients that perceive their illness as chronic, having serious consequences and seriously impacting postoperative activities for a long time are affected by worse illness outcomes, impaired psychological well-being and lower vitality (15, 16). It has been previously presented by our team that psychological cognitive factors may play an essential role in subjective validation of the outcome of surgical treatment of cholelithiasis (9).

Therefore, could the perception of the bigger cuts on one’s body increase the subjective experience of pain?

The associations outlined above can be explained within the biopsychosocial model of medical sciences, emphasizing that health and disease result from the complex interplay of biological, psychological, and social factors (18). Strong evidence supporting the influence of attitudes, cognitions, beliefs, and emotions on physiological processes is also provided by the psychoneuroimmunology researches (11). The results of the current study lead to a conclusion that the worldwide success of videoscopy might be also associated with the influence of psychological cognitive factors such as subjective perception of the severity of the disease and not only biomedical factors such as smaller tissue traumatization, lower pain intensity or better cosmetic effect. This conclusion can be drawn from the observation that the size of the surgical wound is an important source of information for the patient and emphasize the importance of sensory information in forming the illness representation. Such a regularity exists both in the case of patients and the healthy, previously unoperated volunteers. The size of the surgical wound may influence cognitive representations of the disease and further modulate the perception of the severity of the disease and the period needed for full recovery and possibly the level of postoperative pain as well.

On the other hand, the problem of pain intensity as a modifier of cognitive representation should also be outlined. Our study showed that pain intensity was a significant modifier of the accumulated convalescence time. It is difficult to determine if the intensity of pain was influenced by the cognitive processes related to the operation or if it worked in the opposite manner.

Although it could be assumed that the escalation of pain is only a result of the incision size, and the convalescence time depends merely on pain intensity. However, a linear multiple regression analysis did not confirm such hypothesis, but indicated strongly the significance of subjective perception of the severity of the disease as a main factor influencing convalescence. Such findings have been previously documented by other authors on groups of patients undergoing cardiac surgery versus invasive radiology procedures (19, 20).

Moreover, this study might be prone to some additional biases that can not be removed from the clinical setting. There was no randomization of the groups of the surgical approaches performed due to operating surgeons using their own preferred methods. Also, the patients could not be blinded to the patterns of their scars as the wounds were dressed daily. Moreover, in Polish conditions, extrahospital convalescence is often not associated with objective factors, but more influenced by subjective social and professional matters. Despite that, there has not been any better evaluating method proposed neither in Polish or worldwide literature.

There can also be some doubt about the methodological rationale behind asking volun-
teers about the pain experienced by patients. The purpose of this part of the study was to elicit subjective perception in context of limited information – only the size of operative wound. Therefore, further data on the patient could be a significant bias to those perceptions.

In conclusion, the authors would like to emphasize that the study presented a new perspective to explain the so-called “laparoscopy phenomenon”, the faster and smoother recovery even after relatively large and serious surgical procedures. We believe that the benefits observed among the videoscopy patients might be, apart from immunological and pain diminishing factors, also attributed due to psychological influence of the cognitive representations of the disease severity on pain and recovery.

REFERENCES


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