

The effectiveness of prehabilitation, i.e. comprehensive preparation of the patient for surgery based on the measurement of respiratory capacity

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INTRODUCTION & AIM

Prehabilitation is a cost-effective, safe intervention with no side effects and it may have a positive impact on respiratory fitness outcomes, which is particularly important prior to thoracic surgery. However, it is not widely used. It is designed to improve the patient's general health status in order to minimise the risk of complications and ensure the fastest possible recovery. This is particularly important in the case of high-risk surgical patients, who are usually of advanced age and suffer from numerous comorbidities. Implementation of prehabilitation pathways, rationally speaking, seeks to establish contact with patients as soon as possible following the diagnosis.

The aim of the study was to improve the respiratory function of patients who received the same individual physiotherapy intervention in preparation for thoracic surgery. Preparing the body reduces the likelihood of postoperative complications such as infections, pneumonia, and wound healing problems.



METHOD

The pilot study involved 30 patients of both sexes, with lung cancer, who participated in a prehabilitation program prior to a surgical intervention at the department of thoracic surgery of the University Hospital in Rzeszów. Based on the norms identified for each patient, two volumetric measurements were taken before and after a physiotherapy intervention. The measurements of inspiratory capacity were performed using a Voldyne 5000 device, designed to measure and support efficiency of breathing exercise, which is a way to improve the patient's sense of self-efficacy.

CONCLUSION

Compliance with and performance of prehabilitation exercise by the patients during the preparatory period were effective. Prehabilitation was associated with improved performance before the surgery and future research may show this will lead to shorter stay in hospital and to fewer complications. Respiratory therapy as part of the preparation before surgery is an effective method of rehabilitation, which can be demonstrated by volumetric testing. Improved respiratory fitness was observed in patients following the prehabilitation program. The success of the program may be linked to a number of principles and expertise acquired from the sources recommended by the National Institute for Health and Care Excellence for pulmonary rehabilitation.

RESULTS & DISCUSSION

The measurements showed that the value of inspiratory capacity, based on the specific norms, prior to the prehabilitation on average amounted to 1686.67 ml ± 644.06 ml and following the tailored physiotherapy increased to 2030 ml ± 631,86 ml in the study participants. The mean difference of 343.33 ml ± 264.49 ml was statistically significant



Comparison of the results of inspiratory volume measurement before and after physiotherapy.



Inspiratory Volume (ml)	n	mean	median	Min.	Max.	Quartile I	Quartile III	Standard deviation
Before	30	1686,67	1850,00	500,00	3500,00	1100,00	2000,00	644,06
After	30	2030,00	2000,00	1000,00	4000,00	1550,00	2250,00	631,86
Difference	-	343,33	400,00	-500,00	750,00	250,00	500,00	264,49
p		Z=3,68 p<0,001						

A relationship was found between the age of the study participants and the effect of the physiotherapy intervention, as measured by saturation values. This correlation was negative (R=-0.46, p=0.010), meaning that patients with increasing age achieved decreasing treatment effects. Greater effects were seen in younger patients.

Relationship of the results of the measurement of inspiratory volume and saturation to the age of the subjects.

Variables	R	p
Age and effect (saturation difference) [%]	-0,46	0,010
Age and effect (Voldyne5000 difference) [ml]	-0,08	0,673
Age and effect (Voldyne5000 difference) [% of norm]	-0,04	0,818



FUTURE WORK

The future of prehabilitation lies in its widespread implementation as a standard in perioperative and oncological care, making it a key element of treatment. Further development of prehabilitation protocols, the use of telemedicine for patient monitoring and support, and the integration of the patient as an active partner in the treatment process are expected. This approach aims to improve treatment outcomes, reduce complications, and shorten recovery times.