Wawryków Agata, Korabiusz Katarzyna, Stecko Monika, Janik Inga, Sawicka Karolina, Wawryków Paweł, Harasimowicz Joanna. Late effects of children following cancer therapy. Journal of Education, Health and Sport. 2018;8(5):319-324. eISNN 2391-8306. DOI http://dx.doi.org/10.5281/zenodo.1419095
http://ojs.ukw.edu.pl/index.php/johs/article/view/6000

The journal has had 7 points in Ministry of Science and Higher Education parametric evaluation. Part b item 1223 (26/01/2017).
1223 Journal of Education, Health and Sport eissn 2391-8306 7

The authors declare that there is no conflict of interests regarding the publication of this paper.
Received: 05.05.2018. Revised: 10.05.2018. Accepted: 30.05.2018.

Late effects of children following cancer therapy

mgr Agata Wawryków[1], mgr Katarzyna Korabiusz[1], mgr Monika Stecko[1], mgrIngaJanik[1], lek. Karolina Sawicka[2], dr n. med. Paweł Wawryków[2], mgrJoannaHarasimowicz[3]

[1] Pomorski Uniwersytet Medyczny w Szczecinie, Studium Doktoranckie Wydziału Nauk o Zdrowiu, ul. Żołnierska 54, 71-210 Szczecin

[2] Pomorski Uniwersytet Medyczny w Szczecinie, Klinika Pediatrii i Onkologii Dziecięcej, ul. Unii Lubelskiej 1, 71-252 Szczecin

[3] Pomorski Uniwersytet Medyczny w Szczecinie

Key words: children, malignancies, treatment, late side effects

Słowa kluczowe: dzieci, nowotwory, leczenie, odległe powikłania

Abstract:

In recent years, thanks to the significant progress in medicine, about 75% of children are successfully treated of malignancies. Due to very intensive methods of therapy, anti-cancer treatment is associated with the high risk of complications - both early and late. The paper presents the long-term consequences of cancer treatment in childhood.

Abstrakt:

W ostatnich latach, dzięki znacznemu postępowi w medycynie, około 75% dzieci zostaje skutecznie wyleczonych z choroby nowotworowej. Ze względu na bardzo intensywne formy leczenia, terapia przeciwnowotworowa wiąże się z wysokim ryzykiem powikłań - zarówno wczesnych, jak i późnych. W pracy przedstawiono odległe konsekwencje leczenia nowotworów w dzieciństwie.

Introduction

Every year, about 1200 new cases of malignant tumors in children are noticed in Poland [1]. Thanks to the development of diagnostic and therapeutic options, much more patients will be succesfully treated of cancer. Currently, the 5-year overall survival rate in the whole group of children with malignancies raises to 75-80% [2]. Intensive treatment including: chemotherapy, radiotherapy and surgery increases the risk of many complications of - both early and late [3]. Early complications appear most often during or just after anticancer treatment. However, long-term effects may occur even many years after the finished treatment.

In the United States, observation of patients who have had malignancies in childhood has been conducted for many years. Also in Poland, these data are collected from centers which are treating pediatric oncological patients [4]. Patients who have completed anticancer treatment require regular, highly specialized care. The optimal form of care is a team consisting of: physician, psychologist, dietitian, physiotherapist, psychologist and dentist [5].

Late side effects of treatment

The risk of long-term complications is related both to the type and intensity of oncological treatment. The variety of side effects also depends on the type of malignancy, its

location, as well as the state of health before the disease and age at the time of the diagnose. Other factors also include: genetic predisposition, sex, race, and ethnicity. [6].

A study in the United States has shown that patients treated for bone malignancies, central nervous system (CNS) tumors and Hodgkin's disease (HD) are at high risk of serious, life-threatening or disabling diseases in later life. These included: replace one of the large joints because of ortophedic problems, congestive heart failure, secondary malignancies, cognitive disorders, coronary heart disease, stroke, renal failure, hearing loss, unilateral loss of vision and ovarian failure [7]. It has also been shown that over 62% of patients succesfully treated of cancer in childhood demonstrate at least one distant, chronic disease associated with previous anticancer therapy, including 27% severe complication, while approximately 24% have dysfunction of several organs. The radio- and chemotherapy used during treatment leads to a 10-fold more frequent occurrence of serious organ diseases compared to healthy siblings, with the risk of serious complications increasing over time [8].

Adverse effects of the anticancer treatment may seen in all body systems. The most serious are complications from the cardiovascular system. The applied chemotherapy may lead to cardiomyopathy, cardiac arrhythmias and heart failure depending on the cytostatics used [9]. Serious complications are observed also in the respiratory system. Chemo- and radiotherapy may cause lung tissue damage, interstitial fibrosis and destruction of alveoli [10]. Oncological treatment negatively affects the kidneys and urinary system. The most frequently observed diseases are: chronic renal failure and hypertension, while bladder radiotherapy may result with fibrosis [11]. Within the digestive system, symptoms are usually acute. In patients after the treatment can be observed: fibrosis of the esophagus, small and large intestine, malabsorption syndrome, chronic diarrhea, which consequently lead to weight loss and growth disorders [12]

More than 40% of children who have suffered from malignancies have endocrine disorders. They are associated with underlying disease, surgical treatment, radiotherapy, chemotherapy and steroid therapy.

One of the most common disorders is growth hormone deficiency (especially in children who have undergone irradiation of the central nervous system). Moreover, premature or late sexual maturation, thyroid hormone deficiencies and gonadal dysfunction are observed [8]. Cytostatic drugs and pelvic radiotherapy may cause damage to the gonadal function in both men and women.

Anti-cancer therapy (especially CNS radiotherapy and surgery) may cause damage in the nervous system. The most commonnly observed problems are: neurocognitive disorders, dysfunctions of the sensory organs (tinnitus, damage to the hearing organ, increased intraocular pressure) and neuropsychological disorders [13].

Complications of the musculoskeletal system occur in 11-40% of children after completion of anticancer treatment. The growth cartilages are very sensitive to the cytostatic drugs and irradiation. This treatment may cause bone growth disturbances and results defects in posture, bone growth disparities and distortions. A long-term complication of treatment may be also temporary bone demineralization, so it is very important to perform densitometric check-ups. Cases of radiation-induced osteonecrosis as well as underdevelopment of irradiated muscles have alsobeen described [8].

Summary

Most children after oncological treatment require specialized care to control long-term complications. Cytostatic treatment and radiotherapy lead to many disorders (including neurological, cardiological, endocrinological, hearing and visual problems as well as psychological). Physical and psychosocial rehabilitation plays a very important role in the prevention of some late side effects of oncological treatment [14]. Its main purpose is to prevent functional disorders of internal organs and to limit the number of patients with disabilities. Children's rehabilitation centers (including health resorts) are providing physiotherapy to restore psychophysical fitness and improve patients quality of life [15]

Literature

1. Tojza A.: Formalne i nieformalne systemy wsparcia rodziny dziecka z chorobą nowotworową [w:] Aktualne problemy wsparcia społecznego osób niepełnosprawnych, red. Kwaśniewska G., Wojnarska A., Lublin 2004, s. 49 -56
2. Hampton T. Cancer treatment’s trade-off: years of added life can have long-term costs. JAMA. 2005;294:167–168
3. Markowicz M., Epidemiologia chorób nowotworowych u dzieci [w:] Bez recepty 2011/06, s.31-33

4. Krawczuk-Rybak M., Panasiuk A., Muszyńska - Rosłan K., Stachowicz-Stencel T., Drożyńska E., Balcerska A., Pobudejska A., Szczepański T., Sadowska J., Wachowiak J., Czajńska A., Perek D., Zubowska M., Młynarski W., Sęga Pondel D., Kazanowska B., Chybicka A., Badowska W., Szymańska-Miller D., Kowalczyk J., Kołtan A., Wysocki M., Wieczorek M., Sobol G., Garus K., Balwierz W., Wawrzeńczyk A., Kamieńska E., Urasiński T.: Stan zdrowia polskich dzieci i młodzieży po zakończonym leczeniu przeciwnowotworowym. Onkol. Pol., 2012, 3, 96-102
5. Krawczuk – Rybak M.: Poprawa stanu zdrowia po leczeniu przeciwnowotworowym dzieci i młodzieży wyzwaniem dla lekarzy XXI wieku [w:] Medycyna Wieku Rozwojowego 2008, XII, 4, cz.2, s. 987-994.
6. Oeffinger K.C., Mertens A.C., Sklar C.A., Kawashima T., Hudson M.M., Meadows A.T., Friedman D.L., Marina N., Hobbie W., Kadan-Lottick N.S., Schwartz C.L., Leisenring W., Robison L.L.: Chronic Health Conditions in Adult Survivors of Childhood Cancer. N. Engl. J. Med., 2006, 15, 1572-1582.
7. Joseph D. Dickerman: Odległe skutki leczenia nowotworu złośliwego w dzieciństwie, Pediatria po Dyplomie Vol. 13 Nr 1, Luty 2009, s.16-20.
8. Krawczuk - Rybak M.: Odległe następstwa leczenia przeciwnowotworowego w dzieciństwie – na podstawie przeglądu piśmiennictwa i doświadczeń własnych [w:] Developmental Period Medicine, 2013, XVII, 2, s.130-136
9. Młot B., Rzepecki P.: Kardiotoksyczność leczenia onkologicznego [w:] Journal of Oncology 2010, volume 60, Number 6, s.536-547
10. Huang T.T., Hudson M.M., Stokes D.C., Krasin M.J.,Spunt S.T., Ness K.K.: Pulmonary outcomes in survivors of childhood cancer: a systematic review. Chest 2011, 4, 881-901
11. Jones P.D., Spunt S.L., GreenD., Springate J.G.: Renal late effects in patients treated for cancer in childhood: a report from the Children Oncology Group. Pediatr. Blood Cancer 2008, 6, 724-731
12. Feing S.A., Gamis A.S., Hord J.D. Kodish E.D., Mueller B.U., Werner E.J., Berkow R.L. : Long-term Follow-up Care for Pediatric Cancer Survivors. Pediatrics, 2009, 123, 906- 915
13. Dembowska - Bagińska B., Filipek I., Olczak - Kowalczyk D.: Odległe następstwa leczenia nowotworów ośrodkowego układu nerwowego w: Perek D., Roszkowski M., (red.) Nowotwory ośrodkowego układu nerwowego u dzieci. Diagnostyka i leczenie. Fundacja NEURONET, Warszawa 2006, s.163-181

14. Wawryków A., Lubkowska A.: Analiza lecznictwa uzdrowiskowego dzieci po leczeniu przeciwnowotworowym [w:] Journal of Education, Health and Sport. 2016;6(2):325-336
15. Rongies W., W. Dolecki W.: Podstawy rehabilitacji w onkologii. [w:] Deptała A.(red.) Onkologia w praktyce, Warszawa 2006, s.361