

Babuška-Rocznik Magdalena, Wojtanowska-Kaczka Magdalena, Kowalski Mateusz, Skalik Marta, Racz Oliver, Oliwko Elżbieta, Rocznik Wojciech. The level of platelets in patients operated for a fracture of the neck of the femur. *Journal of Education, Health and Sport*. 2021;11(5):101-109. eISSN 2391-8306. DOI <http://dx.doi.org/10.12775/JEHS.2021.11.05.010> <https://apcz.umk.pl/czasopisma/index.php/JEHS/article/view/JEHS.2021.11.05.010> <https://zenodo.org/record/4784235>

The journal has had 5 points in Ministry of Science and Higher Education parametric evaluation. § 8. 2) and § 12. 1. 2) 22.02.2019.

© The Authors 2021;

This article is published with open access at Licensee Open Journal Systems of Nicolaus Copernicus University in Torun, Poland

Open Access. This article is distributed under the terms of the Creative Commons Attribution Noncommercial License which permits any noncommercial use, distribution, and reproduction in any medium, provided the original author (s) and source are credited. This is an open access article licensed under the terms of the Creative Commons Attribution Non commercial license Share alike. (<http://creativecommons.org/licenses/by-nc-sa/4.0/>) which permits unrestricted, non commercial use, distribution and reproduction in any medium, provided the work is properly cited.

The authors declare that there is no conflict of interests regarding the publication of this paper.

Received: 02.05.2021. Revised: 21.05.2021. Accepted: 24.05.2021.

## The level of platelets in patients operated for a fracture of the neck of the femur

Magdalena Babuška-Rocznik<sup>1</sup>, Magdalena Wojtanowska-Kaczka<sup>1</sup>, Mateusz Kowalski<sup>1</sup>, Marta Skalik<sup>2</sup>, Oliver Racz<sup>3</sup>, Elżbieta Oliwko<sup>1</sup>, Wojciech Rocznik<sup>1</sup>

<sup>1</sup>The Jan Grodek State University in Sanok, Medical Institute, Poland

<sup>2</sup>Nicolaus Copernicus University in Toruń, Ludwik Rydygier Collegium Medicum in Bydgoszcz, Poland

<sup>3</sup>University of Pavol Jozef Safarik, Kosice, Slovak Republic

### Summary

**Admission.** Treatment of hip fractures is one of the most serious challenges for musculoskeletal traumatology, as these fractures occur mainly in the elderly. Despite the fact that modern traumatology has reached a high level, femoral neck fractures are still a very big problem among societies.

**The purpose of the study** was an assessment of the level of platelets in patients

treated with surgery for a fracture of the neck of the femur.

**Material and method.** The research was conducted in December 2019 in one of the trauma and orthopedic wards in Upper Silesia. The study included 35 patients aged 48-78 years treated surgically due to a hip fracture. All obtained data on patients come from medical records.

**Results.** The analysis showed that 8 of the 35 patients included in the study had a decrease in the level of platelets 24 hours after the surgical treatment of a hip fracture. One week after the surgery, the level of platelets was normal.

**Conclusions.** A relationship has been demonstrated between the level of platelets and surgical treatment of a fracture of the femoral neck. A significant drop in platelets was noticed in 23% of the subjects 24 hours after the surgery and their normal value was reached a week later. The problem requires further observation and research.

**Key words:** hip fracture, platelet levels, surgery

## ADMISSION

Treatment of hip fractures is one of the most serious challenges forand traumatology of the musculoskeletal system, because these fractures occur mainly in the elderly, who are also very often burdened with other diseases. Therefore, this injury is very often accompanied by difficulties related to the growth of bone tissue, which may lead to a high risk of complications or various complications. Despite the fact that modern traumatology has reached a high level, femoral neck fractures are still a very big problem among societies [1,2].

After a hip fracture, a large group of elderly patients is under obligatory temporary or permanent care. The mortality associated with this procedure is often the result of complications causedcaused by infections, thrombosis and complications from the cardiovascular system. The most common death of the patient is six months after surgery,

despite the fact that it was successful. An indicator of increased risk is the inability to stand upright quickly. The observations show that older people who had depression after the fracture more often died due to various complications [23].

Fractures of the femoral neck, like other fractures, heal according to the laws of the pathophysiology of one hundred bone tissue. Healing of this type of fracture is particularly unfavorable because it takes place in specific anatomical and pathomechanical conditions. These are primary and secondary proximal ischemia, as well as the specific instability of these fractures [18].

The choice of the treatment method depends not only on the type of hip fracture, but also on the age, general health of the patient and the operating skills [16].

There are four fundamental principles in the treatment of hip fractures. Belong to them:

- resolutely avoidance of re-damage to the vascularization of the fragments,
- quick and very accurate fracture adjustment,
- early stable fixation of the fragments,
- allowing the injured lower limb to take physiological actions as soon as possible [16].

It should be emphasized, however, that conservative treatment is not working nowadays. It is used only in selected cases. Belong to them:

- true wedge fractures of the femoral neck
- early stress fractures of the femoral neck,
- fractures of the femoral neck partially stable - supposedly wedged, there is a significant burden on the patient here, as well as a high surgical risk,
- an unquestionable contraindication to surgical treatment [16].

Conservative treatment is associated with long immobilization, which may lead to serious complications, such as: circulatory failure, bedsores, nappy rash, as well as urine retention, constipation, discouragement to life (depression), weakness and, which is also important, loss of independent movement. This treatment for hip fractures takes an average of six to ten weeks. This is the period of satisfactory healing of the clinical fracture. After this time, the patient starts walking, but for the first four months without any load on the affected limb [18].

In overburdened patients, i.e. elderly patients, who cannot undergo surgical treatment, the intra-articular lidocaine blockade is used from the first days, with simultaneous care in the

form of rehabilitation, upright positioning or planting. In such a case, there is a possibility of the formation of a pseudo-joint at the fracture site [16].

The fundamental goal of the treatment of hip fractures is the best possible limb efficiency in the shortest possible time, because this disease is most common in the elderly [2]. Already a few days after the fracture and surgery, the patient must be upright quickly and it is necessary to protect him against serious complications, both general and local [16].

## PURPOSE OF THE STUDY

The aim of the study was to assess the level of platelets in patients treated with surgery for a hip fracture.

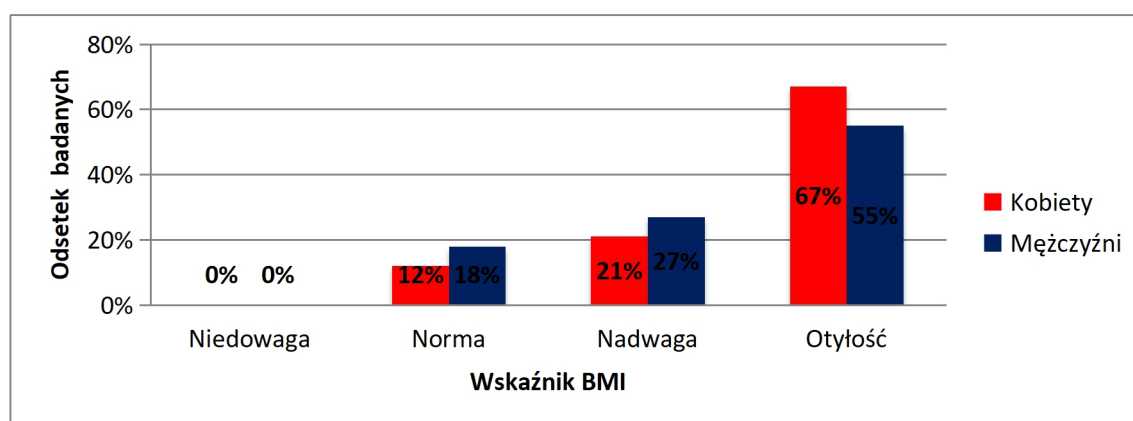
## MATERIAL AND METHOD

The research was conducted in December 2019 in one of the trauma and orthopedic departments in Upper Silesia. The study included 35 patients aged 48-78 years treated surgically due to a hip fracture. All obtained data on patients come from medical records.

## FINDINGS

The research group consisted of 24 women (69%) and 11 men (31%).

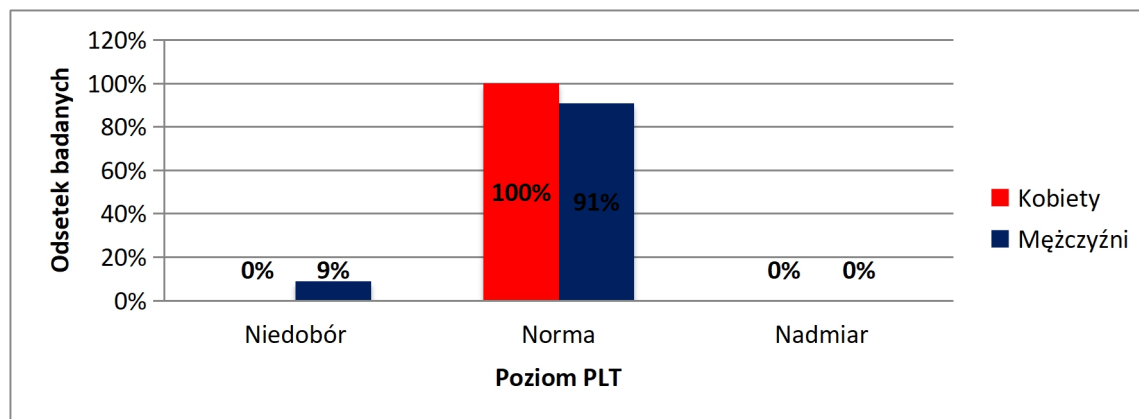
Figure 1 shows the breakdown of the study population in terms of BMI, which could be one of the causes of a hip fracture. Studies have shown that only 3 (12%) women were within the normal BMI index, 5 (21%) were overweight, and 16 (67%) were obese. However, in the group of men 2 (18%) were normal, 3 (27%) were overweight and 6 (55%) were obese.



Dig. 1 Classification of the study group according to the BMI index

Source: own material

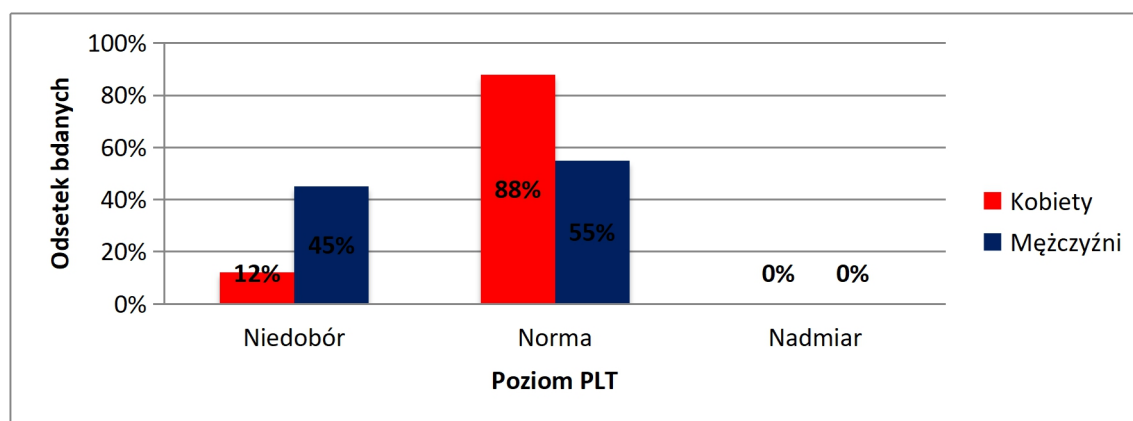
Figure 2 presents the number of platelets in the examined women and men before the procedure. All (24 - 100%) tested women had normal PLT levels. In the group of men, 1 (9%) had a deficiency, and 10 (91%) had normal PLT levels. No increased amount of PLT was observed in any of the subjects.



Dig. 2 Amount of PLT before surgery

Source: own material

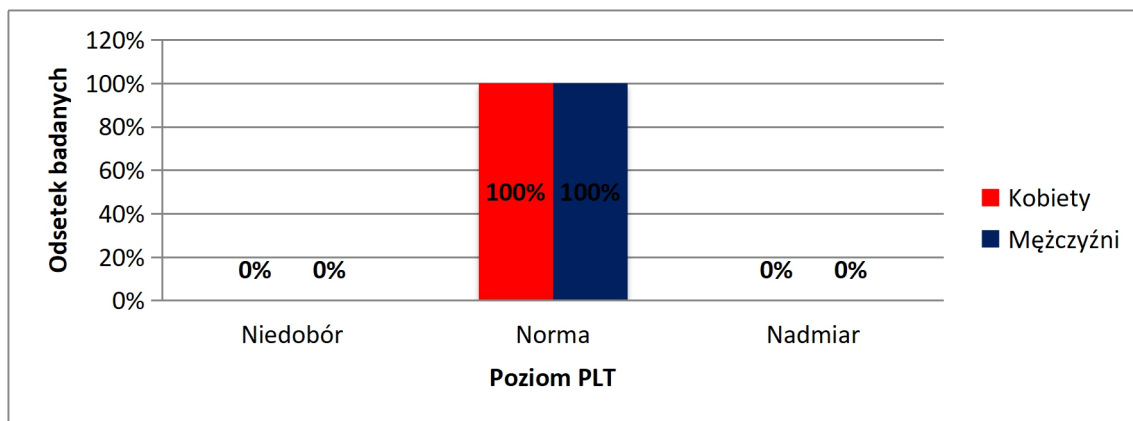
In figure 3 shows the amount of PLT in the study group 24 hours after the procedure. PLT deficiency was observed in 3 (12%) women, and platelet levels were normal in 21 (88%) cases. For men, 5 (45%) were deficient and 6 (55%) were normal. There was no increased number of platelets in the study group.



Dig. 3 Amount of PLT daily after surgery

Source: own material

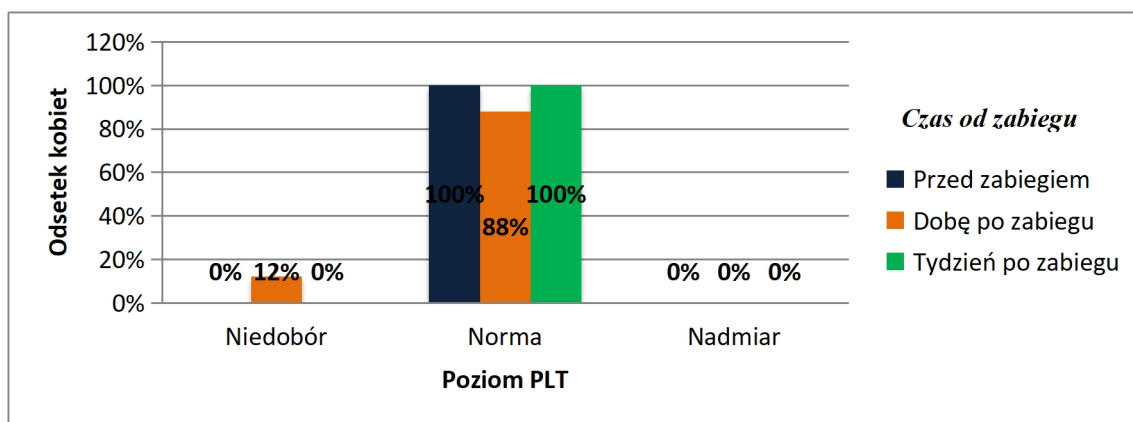
Figure 4 shows the number of platelets one week after surgery. Both 100% of women (24) and men (11) had normal PLT levels. There was no increased or decreased PLT level in the study group.



Dig. 4 Amount of PLT one week after surgery

Source: own material

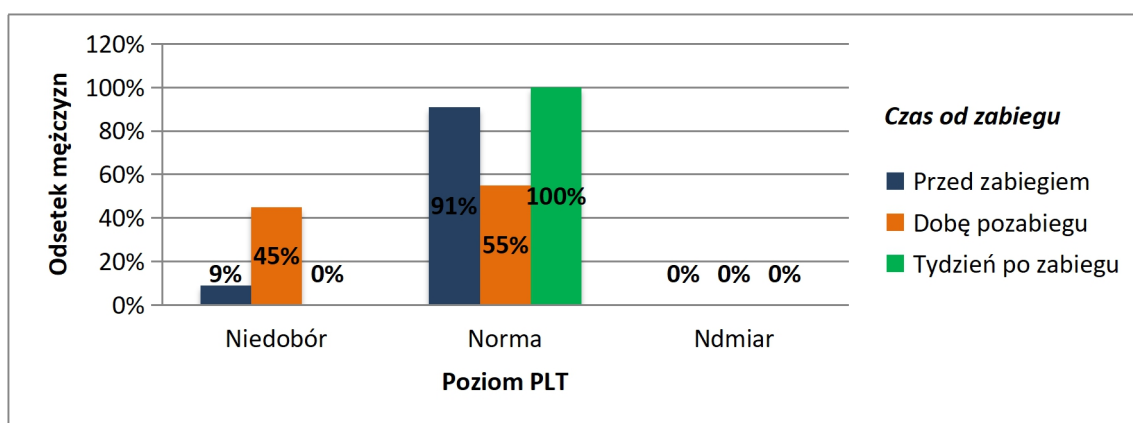
Figure 5 presents the level of PLT in women before the procedure - 24 (100%) women were within the normal range, but no deficiency and increased number of platelets were recorded. On the second measurement the day after surgery - 3 (12%) women had PLT deficiency, and 21 (88%) were normal. There were no women with elevated levels of thrombocytes. However, in the third measurement, as many as 24 (100%) women had normal platelet levels and no deficiency or increased amount of PLT was noted.



Dig. 5 PLT level in women

Source: own material

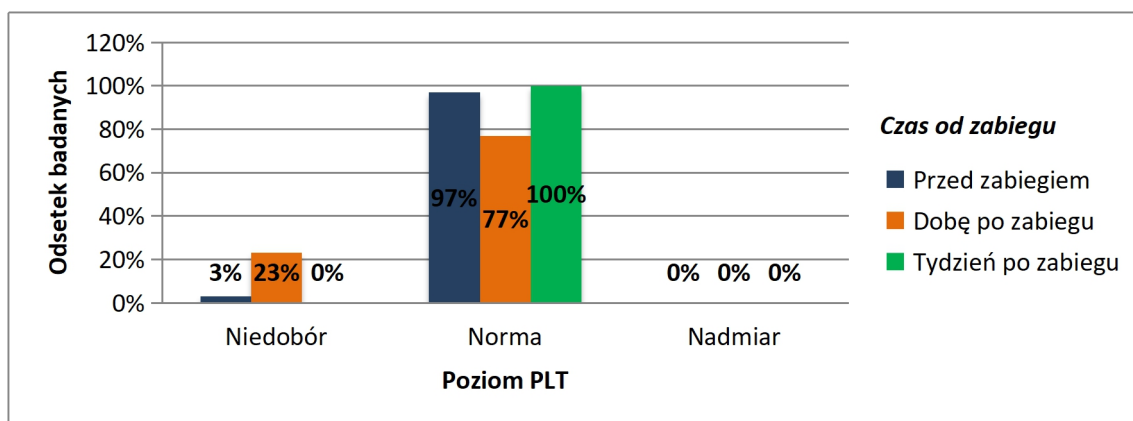
Figure 6 presents the level of platelets in the surveyed men. Before surgery - 1 (9%) of men developed PLT deficiency. The PLT result of the remaining men (10-91%) was within the normal range. The increased amount was not observed. In the study one day after surgery, 5 (45%) men were PLT deficient, and the results of 6 (55%) were normal. Again, no increased amount of PLT was noted. In the study, one week after surgery, 11 (100%) men achieved normal results.



Dig. 6 PLT level in men

Source: own material

In figure 7 shows the level of PLT in the study group before the procedure. Overall, only 1 (3%) of the patients had a thrombocyte deficiency, while 34 (97%) had normal PLT levels. In the second study, the day after surgery, the analysis showed that 8 (23%) patients had a platelet deficiency, and 27 (77%) of them had normal PLT levels. In the third test, one week after surgery, normal PLT levels were observed in 35 (100%) patients. There was no deficiency and no increased number of thrombocytes in the blood.



Dig. 7 PLT level in the study population

Source: own material

## DISCUSSION OF RESEARCH RESULTS

Platelet counts are performed as part of routine surveillance, often as part of periodic testing. And it is used to detect, recognize and monitor disorders and diseases that affect the platelet count. Thanks to this test, it is possible to recognize both disorders in which the number of platelets is too low, and then we are dealing with thrombocytopenia, and too high,

i.e. a condition known as thrombocytosis. Thrombocytopenia may develop suddenly as acute thrombocytopenia, may be temporary, or it may develop over an extended period of time, i.e. chronic thrombocytopenia. Correct and rapid differentiation of disorders in the number of platelets is crucial when choosing a possible therapy. Due to the etiology, thrombocytopenia can be divided into the central, i.e. resulting from the reduction in the production of blood platelets in the bone marrow and peripheral, consisting in inappropriate distribution or increased destruction.

Due to its mechanism, thrombocytopenia may be pseudo-like (pseudothrombocytopenia), may result from haemodilution, may result from excessive use of platelets, excessive destruction or sequestration of platelets, also on an immune basis, or may also be caused by reduced production of platelets in the bone marrow. In the absence of factors disturbing the reconstruction, after a sudden loss of platelets and, for example, surgery, their number should return to the baseline values after 3-4 days. Conversely, a slow decline in platelets over 5-7 days indicates a problem of overuse or decreased production. On the other hand, a significant and sudden drop in the platelet count within 1-2 days most likely indicates an immunological cause, e.g. a transfusion or drug reaction.

## CONCLUSIONS

Based on the conducted research, the following conclusions were drawn regarding the number of platelets operated on for hip fracture:

1. Before the procedure, all patients had a blood platelet test, i.e. thrombocytes, and only one patient was deficient. However, in the remaining patients before the procedure, PLT was normal.
2. The next platelet measurement was taken the day after surgery. At that time, approximately 23% of patients developed PLT deficiency, including five men and three women. On the other hand, most of the patients, about 77% of PLT, were normal.
3. The third PLT measurement was taken one a week after the procedure, then in all patients this level stabilized and was normal.

## BIBLIOGRAPHY

1. Cwanek J., Trybuchowicz A., Ciećkiewicz A., Bać D. : Treatment of hip fractures. Problems of Applied Sciences, 2017; 6: 119-126.
2. Miturski A., Zybińska S., Wardach K., Ochal A., Karska A., Nogalski A. : Analysis of



- the incidence of fractures in people over 65 years of age. *ER* 2011; 4 (2): 55-62.
3. Atay IM, Aslan A, Burc H, Demirci D, Atay T. Is depression associated with functional recovery after hip fracture in the elderly? *J Orthop Sci* 2016; 13: 115-118.
  4. Prestmo A, Hagen G, Sletvold O, Helbostad JL, Thingstad P, Taraldsen K, Lydersen S, Halsteinli V, Saltnes T, Lamb SE, Johnsen LG, Saltvedt I. Comprehensive geriatric care for patients with hip fractures: a prospective, randomized, controlled trial. *Lancet* 2015; 385: 1623-1633.
  5. Żuk T., Dziak A., *Orthopedics with traumatology of the musculoskeletal system*, Wydawnictwo Lekarskie PZWL Warszawa 1993.
  6. Tylman D., Dziak A. (eds.), *Traumatology of the musculoskeletal system, Volume II*, Wydawnictwo Lekarskie PZWL, Warsaw 1996.
  7. Hur JW, Lee YY, Lee WS, Jun JB. Erythromelalgia as a presenting manifestation in a patient with essential thrombocythemia complicating renovascular hypertension due to unilateral renal artery stenosis. *Rheumatol Int.* 2005; 26: 83–85.
  8. Harrison CN, Gale RE, Machin SJ. A large proportion of patients with a diagnosis of essential thrombocythemia do not have a clonal disorder and may be at lower risk of thrombotic complications. *Blood* 1999; 93: 417–424.
  9. Windyga J. *Blood coagulation disorders in everyday clinical practice*. Termedia publishing house, Poznań 2017
  10. Ziaja D, Biolik G, Stołtny-Sieroń K, Tkocz M, Chudek J. Thrombocytosis as a problem in the surgery clinic. *Polish Surgery* 2012, 14, 1-2, 95-105.