



Platelet Indices in Uterine Leiomyoma Compared with other Major Gynecological Diseases

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Authors' contributions

This work was carried out in collaboration among all authors. Author RC designed the study and performed data curation. Author DS performed supervision and wrote the final manuscript. Author IP managed the literature searches and wrote the first draft of the manuscript. Author AC performed data curation and wrote the first draft of the manuscript. Author RS managed the analysis of the study and wrote the final manuscript. All authors read and approved the final manuscript.

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ABSTRACT

Aims: The aim of this study was to determine whether platelet indices are of value when diagnosing uterine leiomyomas.

Study Design: Prospective study.

Place and Duration of Study: Elena Doamna Obstetrics and Gynecology University Hospital, Iasi, Romania, between January 2017 and December 2017.

Methodology: In this study 98 patients were selected from 140 consecutive screened patients and operated upon; 53 of the operated-on patients had uterine leiomyoma (Group 1) and 45 had severe non-leiomyoma gynecological disease (Group 2). Complete blood count, just before the

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intervention was studied.

Results: The RDW-CV, PLT and PCT values were significantly higher ($P = .017$, $P = .05$, $P = .001$, respectively) in leiomyoma patients, whereas WBC, RBC, MPV, PDW, P-LCR, NLR, PLR were not significantly different between the 2 groups. The inflammatory indices WBC, NLR and PLR were not significantly higher in leiomyoma patients compared with non-leiomyoma patients, despite the fact that leiomyoma also has an inflammatory cause. Although leiomyomas were accompanied by acute or chronic blood loss, only RDW-CV was significantly higher ($P = .017$) in leiomyoma patients, whereas HCT and RBC values were not significantly different between the 2 groups.

Conclusion: The RDW-CV, PLT and PCT values were significantly higher in leiomyoma patients, whereas WBC, RBC, MPV, PDW, P-LCR, NLR, PLR were not significantly different. Still, the specificity of RDW-CV, PLT and PCT was not high enough to allow using them as diagnostic tools for leiomyoma.

Keywords: Uterine leiomyoma; platelet indices; white blood cells count; red blood cells count; hematocrit.

1. INTRODUCTION

Leiomyomas are the most frequent benign tumors of the reproductive system in women. Factors that trigger leiomyoma formation are numerous and still not well understood, ranging from lifestyle to hormones, hypertension, and infection [1]. Platelet count is gender-dependent, being higher in women than in men [2]. Patients with thrombocytosis in primary care have an increased risk of cancer, and some, but not all, cancers have raised platelets as an early marker [3]. Thrombocytosis is bad prognostic factor and associated with poorer outcomes in ovarian cancer, endometrial cancer, and cervical cancer [4]. PDW were higher in cervical carcinoma patients than in control subjects [5]. Both NLR and PLR are positively correlated with pre-treatment platelet counts in patients with non-surgically treated uterine cervical carcinoma [6]. Platelets play important roles in the development of adenomyosis [7]. MPV and PDW may have predictive value in the discrimination of benign and malignant endometrium diseases [8].

Because hemorrhage generally accompanies uterine leiomyomas, and hemorrhage can alter the red blood cell count and the platelet count, the goal of this study was to look for any possible correlation between platelet indices and leiomyomas. In addition to the platelet indices, we also studied other red blood cell (red blood cell distribution width, hematocrit) and white blood cell values (white blood cell count, neutrophil-to-lymphocyte ratio), for early detection of uterine leiomyomas.

2. MATERIALS AND METHODS

In this prospective study, 140 consecutive female patients, who had been admitted to an obstetrics and gynecology university hospital for uterine leiomyoma or other major gynecological diseases, which required surgery as treatment, between January 1, 2017 and December 31, 2017, were selected. They formed 2 groups: 70 patients with uterine leiomyomas and 70 patients with a non-leiomyoma gynecological disease. Of the 70 patients with uterine leiomyomas, diagnosed by either transabdominal or transvaginal ultrasonography upon admittance, 17 were excluded because they did not undergo surgery and had no pathological confirmation of uterine leiomyoma(s); therefore, group 1 consisted of 53 patients with surgically confirmed and removed uterine leiomyoma(s). Group 2 included patients with any other severe gynecological disease that required surgery as treatment for healing. Of the second group, 25 patients were not operated upon during the study period or were over 70 years of age (when leiomyomas do not generally exist), so they were excluded from the study; therefore only 45 patients were left to be studied in group 2. These 45 patients had been admitted for the following conditions: uterine adenocarcinoma (2 patients), endometrial neoplasia (1), cervical cancer (1), endocervical polyp (2), extrauterine pregnancy (2), dysplastic lesions of the cervix uteri (1), ovarian cyst, with or without torsion (10), cystocele (1), uterine or vaginal prolapse (5), rectocele (1), old perineal laceration with urinary incontinence (5), Bartholin gland cyst (1), endometrial hyperplasia (1), abnormal uterine bleeding in the perimenopausal period (9),

foreign material granuloma (1), intrauterine device associated with uterine bleeding (1), pelvic inflammatory disease (5). Four patients had 2 of the above conditions: one patient had two ovarian cysts, one in each ovary, a second patient had endocervical polyp and ovarian cyst, a third patient had extrauterine pregnancy and ovarian cyst, and a fourth patient had intrauterine device and ovarian cyst.

Inclusion criteria in the study group (group 1) were: a) patients who were operated upon during that specific period of time and b) patients who had subsequent pathological confirmation of leiomyoma(s). Inclusion criteria in the control group (group 2) were as follows: a) patients who were operated upon during that chosen study period, for a gynecological disease and b) patients who had a subsequent pathological diagnosis other than leiomyoma. Exclusion criteria for group 1 were a) patients who were diagnosed by ultrasound with leiomyoma, but had no pathological confirmation, b) patients who were not operated upon during the study period, and c) pregnant patients, who had leiomyoma and pregnancy, and underwent only cesarean delivery. Exclusion criteria for group 2 included: a) at-term pregnant patients who had leiomyoma and pregnancy, and only underwent a cesarean delivery, b) patients who were not operated upon during that study period, c) patients over 70 years of age who were operated upon for various gynecological diseases. The standard hospital protocol, before any major surgery, included blood harvesting with complete blood count. The blood values included in this study were white blood cell count (WBC), red blood cell count (RBC), red blood cell distribution width (RDW-CV), hematocrit (HCT), platelet count (PLT), mean platelet volume (MPV), platelet distribution width (PDW), plateletcrit (PCT), platelet-larger cell ratio (P-LCR), neutrophil-to-lymphocyte ratio (NLR), and platelet-to-lymphocyte ratio (PLR). The neutrophil-to-lymphocyte ratio (NLR) was calculated by dividing the absolute count of neutrophils by the absolute count of lymphocytes [9]. The platelet-to-lymphocyte ratio (PLR) was calculated by dividing the absolute count of platelets by the absolute count of lymphocytes [10].

Blood analysis was performed using Rayto RT-7600 Auto Hematology Analyzer. Statistical analysis was performed with IBM SPSS version 18. For descriptive measures, we computed the mean, standard deviation, minimum and maximum limits. To compare the data the Student *t* test or Mann Whitney U was applied

according to data distribution. Standard cutoff significance $P = .05$ was used to decide on hypothesis conclusions.

Ninety-eight Caucasian patients were studied and operated upon, 53 patients with uterine leiomyoma (group 1) and 45 with severe non-leiomyoma gynecological disease (group 2). Group 1 had a mean age of 44.35 years old (range, 28-61). Group 2 had a mean age of 44.64 years old (range, 19-67).

Datasets of patients, without names, are attached as Supplementary files. Group 1 is File 1, group 2 in File 2.

3. RESULTS

A significant difference was found between the mean values of RDW-CV ($P = .017$), PLT ($P = .05$), and PCT ($P = .001$) in group 1 and control group 2 (Fig. 1-6). No significant difference was found between the mean values of WBC ($P = .13$), RBC ($P = .901$), HCT ($P = .131$), MPV ($P = .083$), PDW ($P = .084$), P-LCR ($P = .116$), NLR ($P = .573$), PLR ($P = .101$) in the 2 groups (Table 1).

The mean value for WBC was higher in the uterine leiomyoma group ($8.65 \times 10^3/\mu\text{L}$; 95% CI 7.87-9.44) than in the non-leiomyoma group ($7.91 \times 10^3/\mu\text{L}$; 95% CI 7.28-8.54), which showed a slight tendency towards inflammation. No statistically significant difference was found ($P = .130$) in WBC counts between the 2 groups.

The mean value for RBC was very close in the uterine leiomyoma group ($4.43 \times 10^6/\mu\text{L}$; 95% CI 4.28-4.58) compared with the non-leiomyoma group ($4.47 \times 10^6/\mu\text{L}$; 95% CI 4.35-4.59). No statistically significant difference ($P = .901$) occurred in RBC counts between the 2 groups. The mean value for RDW-CV was higher in the uterine leiomyoma group (15.11%; 95% CI 14.4-15.82) (Fig. 1) compared with that in the non-leiomyoma group (14.04%; 95% CI 13.61-14.47). A statistically significant difference ($P = .017$) occurred in RDW-CV counts between the 2 groups. According to the ROC curve (Fig. 2), for the cutoff value of RDW-CV = 14.18, sensitivity = 0.604 and specificity = 0.689. Twenty-four leiomyoma study patients (45.28%) had higher RDW-CV counts than normal (Table 2), and no study patient had lower RDW-CV counts than normal (Table 3). In the control non-leiomyoma group, 11 (20.75%) patients had higher RDW-CV counts than normal, and no patient with lower RDW-CV counts than normal.

The mean value for HCT was lower in the uterine leiomyoma group (35.64%; 95% CI 34.11-37.17) compared with the non-leiomyoma group (37.28%; 95% CI 36.10-38.45). No statistically significant difference occurred ($P = .131$) in HCT counts between the 2 groups. The mean value for PLT was higher in the uterine leiomyoma group ($315.5 \times 10^3/\mu\text{L}$; 95% CI 295.8-335.22) compared with that in the non-leiomyoma group ($285.35 \times 10^3/\mu\text{L}$; 95% CI 268.13-302.58) (Fig. 3). There was a statistically significant difference ($P = .050$) in PLT counts between the 2 groups. According to the ROC curve (Fig. 4), for the cutoff value of $\text{PLT}=299 \times 10^3/\mu\text{L}$, sensitivity = 0.585 and specificity = 0.644. In the uterine leiomyoma group, 5 patients (9.43%) had higher PLT counts than normal, and no patient had lower PLT counts than normal. One control group patient (1.88%) had higher PLT counts than normal, and another 1 patient (1.88%) had lower PLT counts than normal. (Tables 2,3).

The mean value for MPV was higher in the uterine leiomyoma group ($8.61 \times 10^{-15}\text{L}$; 95% CI 8.13-9.11) compared with that in the non-leiomyoma group ($7.95 \times 10^{-15}\text{L}$; 95% CI 7.71-8.17). No statistically significant difference ($P = .083$) occurred in MPV counts between the 2 groups.

The mean value for PDW was lower in the uterine leiomyoma group (16.29%; 95% CI 15.21-17.38) compared with the non-leiomyoma group (17.68%; 95% CI 16.9-18.46). No statistically significant difference ($P = .084$) occurred in PDW counts between the 2 groups.

The mean value for PCT was higher in the uterine leiomyoma study group (0.27%; 95% CI 0.25-0.29), compared with the non-leiomyoma control group (0.23%; 95% CI 0.21-0.24) (Fig. 5). A statistically significant difference ($P = .001$) occurred in PCT counts between the 2 groups. According to the ROC curve (Fig. 6), for the cutoff value of $\text{PCT} = 0.235$, sensitivity = 0.623 and specificity = 0.667. One study group patient (1.88%) had a higher PCT count than normal, and none had a lower PCT count than normal. No control patients had higher PCT counts than normal, and only 1 control patient (2.22%) had lower PCT counts than normal. (Tables 2,3)

The mean value for P-LCR was higher in the uterine leiomyoma group (25.63%; 95% CI 22.66-28.6) compared with that in the non-leiomyoma group (21.63%; 95% CI 19.91-23.35). There was no statistically significant difference ($P = .116$) in P-LCR counts between the 2 groups.

The mean value for NLR was higher in the uterine leiomyoma group (2.11; 95% CI 1.87-2.37) compared with that in the non-leiomyoma group (2.09; 95% CI 1.77-2.44). No statistically significant difference ($P = .573$) was noted in NLR counts between the 2 groups. The mean value for PLR was higher in the uterine leiomyoma group (145.47; 95% CI 130.73-160.22) compared with that in the non-leiomyoma group (133.54; 95% CI 120.27-146.82). There was no statistically significant difference ($P = .101$) in PLR counts between the 2 groups.

Table 1. Platelet indices and other blood values in leiomyoma and non-leiomyoma patients

Platelet indices and other blood values	Leiomyoma patients	Non-leiomyoma patients	P
WBC	8.66±2.85	7.91±2.19	.130
RBC	4.43±0.57	4.48±0.45	.901
RDW-CV	15.11±2.7	14.05±1.53	.017
HCT	35.64±5.53	37.28±3.92	.131
PLT	315.51±71.52	285.36±57.34	.050
MPV	8.62±1.79	7.95±0.83	.083
PDW	16.29±3.92	17.68±2.73	.084
PCT	0.27±0.08	0.23±0.05	.001
P-LCR	25.63±10.78	21.63±5.73	.116
NLR	2.12±0.91	2.1±1.12	.573
PLR	145.47±53.51	133.54±44.21	.101

WBC= white blood cell count, RBC= red blood cell count, RDW-CV= red blood cell distribution width, HCT= hematocrit, PLT= platelet count, MPV= mean platelet volume, PDW= platelet distribution width, PCT= plateletcrit, P-LCR= platelet-larger cell ratio, NLR= neutrophil-to-lymphocyte ratio, PLR= platelet-to-lymphocyte ratio

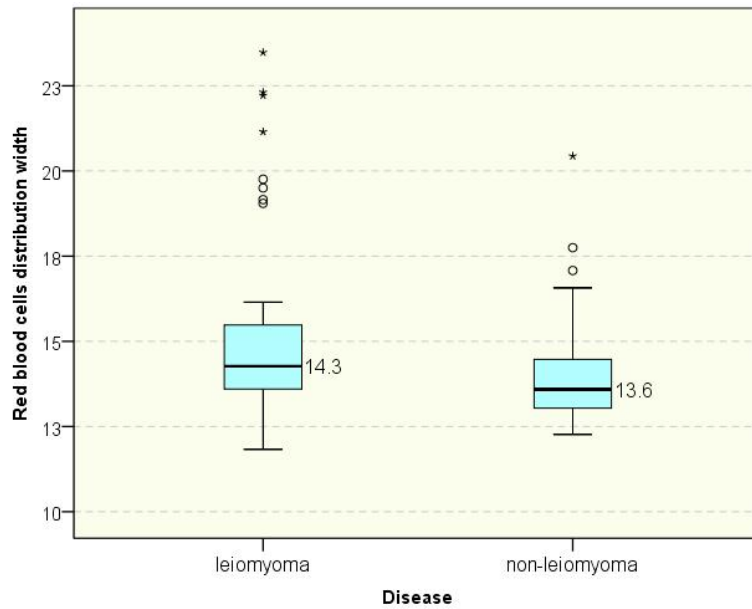


Fig. 1. Mean values of RDW-CV in leiomyoma patients compared with non-leiomyoma patients

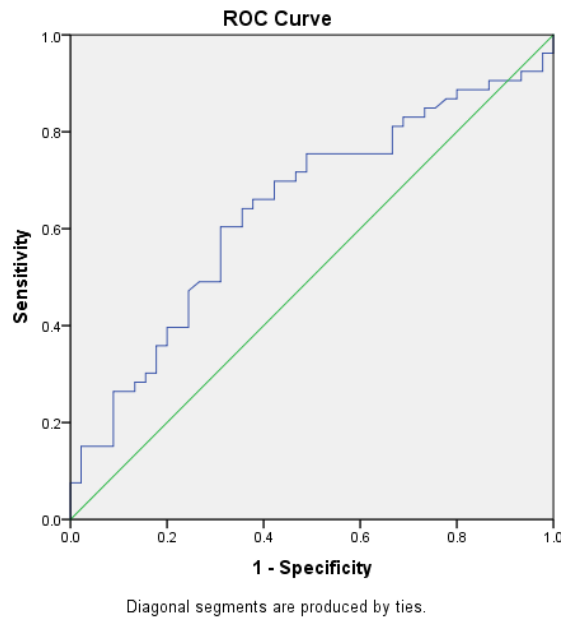


Fig. 2. ROC curve for RDW-CV. Area under the curve = .64. RDW-CV may be used in detecting uterine leiomyoma, but accuracy is poor. Cutoff point = 14.18, sensitivity = .60, specificity = .68

Table 2. Percentage of patients with blood values higher than normal

Blood values	Leiomyoma patients	Non-leiomyoma patients
RDW-CV	45.28%	20.75%
PLT	9.43%	1.88%
PCT	1.88%	0%

RDW-CV= red blood cell distribution width, PLT= platelet count, PCT= plateletcrit

Table 3. Percentage of patients with blood values lower than normal

Blood values	Leiomyoma patients	Non-leiomyoma patients
RDW-CV	0%	0%
PLT	0%	1.88%
PCT	0%	1.88%

RDW-CV= red blood cell distribution width, PLT= platelet count, PCT= plateletcrit

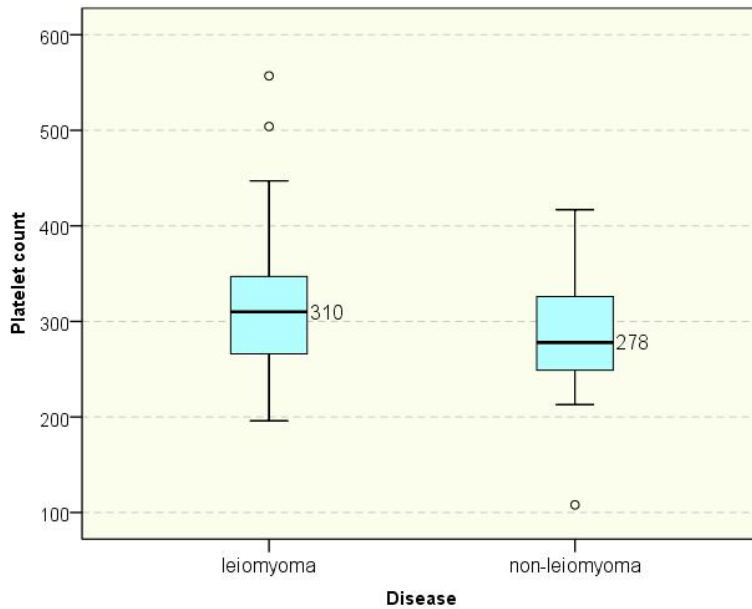


Fig. 3. Platelet count mean values in leiomyoma patients compared to non-leiomyoma patients

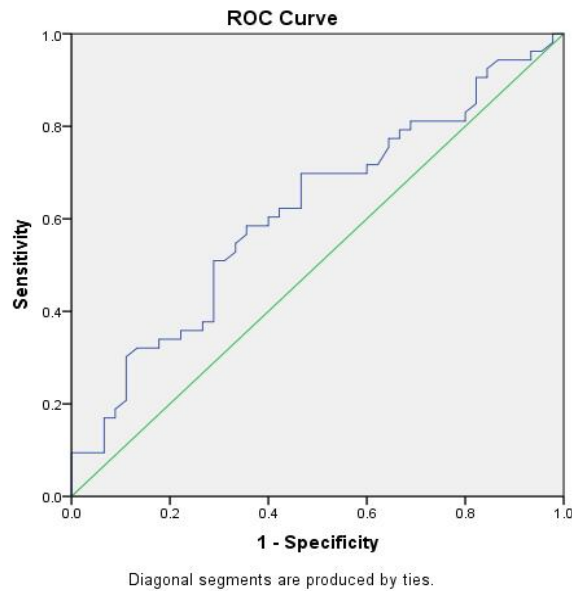


Fig. 4. ROC curve for PLT. Area under the curve = .61. PLT may be used in detecting uterine leiomyoma, but accuracy is poor. Cutoff point = 299, sensitivity = .58, specificity = .64

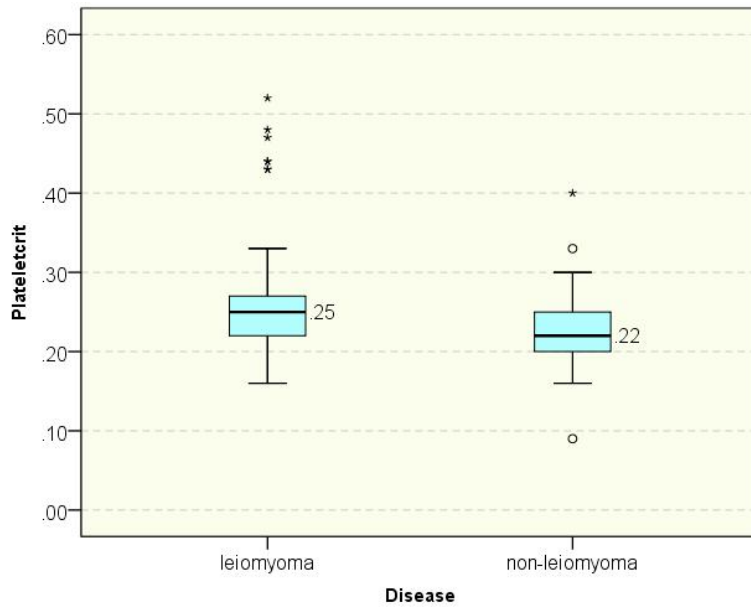


Fig. 5. Plateletcrit mean values in leiomyoma patients compared to non-leiomyoma patients

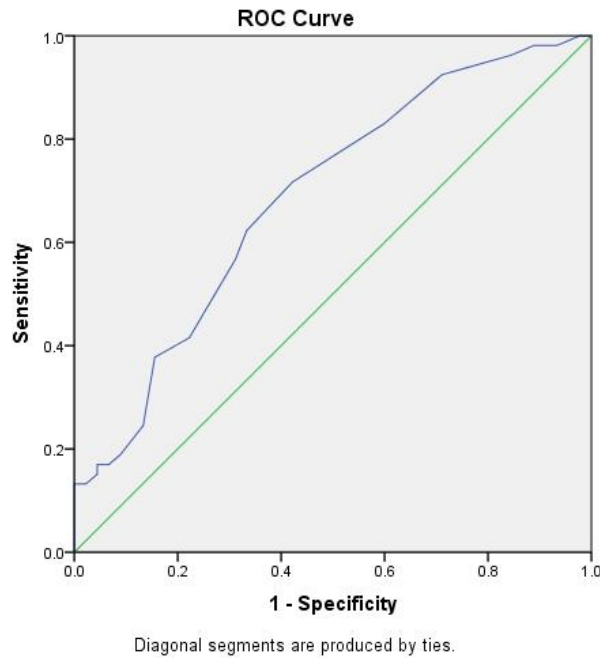


Fig. 6. ROC curve for PCT. Area under the curve = .68. PCT may be used in detecting uterine leiomyoma, but accuracy is poor. Cutoff point = .235, sensitivity = .62, specificity = .66

4. DISCUSSION

A significant difference was found between the mean values of RDW-CV ($P = .017$), PLT ($P = .05$), and PCT ($P = .001$) in the 2 groups. No

significant difference was found between the mean values of WBC ($P = .13$), RBC ($P = .901$), HCT ($P = .131$), MPV ($P = .083$), PDW ($P = .084$), P-LCR ($P = .116$), NLR ($P = .573$), PLR ($P = .101$) in the 2 groups.

The mean value for WBC was higher, but not significantly higher, in the uterine leiomyoma group 1 compared with the non-leiomyoma group 2, ($8.65 \times 10^3/\mu\text{L}$ versus $7.91 \times 10^3/\mu\text{L}$, $P = .130$) although it was still within normal ranges. Ganguli et al [11] reported an increase in white blood cells with clinically defined leukocytosis (over $11 \times 10^3/\mu\text{L}$) only immediately after uterine artery embolization for symptomatic leiomyomas and only in 21% of patients, within 24 hours after the procedure. Hou et al [12] reported transient elevation of white blood cell count only after simple ultrasound-guided high-intensity focused ultrasound treatment of uterine leiomyomas. Our study confirmed these results that WBC remains unchanged in patients with leiomyomas compared with patients with other severe gynecological diseases. The mean value for RBC was not significantly different in group 1 compared with group 2 ($4.43 \times 10^6/\mu\text{L}$ versus $4.47 \times 10^6/\mu\text{L}$, $P = .901$). Due to the minute or significant blood losses in uterine leiomyomas, there is a tendency toward lower RBC than normal, which was present in 26.41% of our patients. Nonetheless, Ono et al [13] reported a case of myomatous erythrocytosis syndrome with the RBC count of $6.65 \times 10^6/\mu\text{L}$, due to the leiomyoma cells strongly positive for erythropoietin on the postoperative pathological examination of the immunostained specimen. De Boer et al [14] also reported a case of uterus myomatosis with only increased hemoglobin levels (14.2 mmol/L) but without polycythemia, which normalized after hysterectomy. We report only 1 patient, aged 40 years old, who had a slightly increased RBC count of $5.41 \times 10^6/\mu\text{L}$, associated with an abnormally low HCT value (35.47%), so it was not myomatous erythrocytosis syndrome.

The mean value for RDW-CV was significantly higher in group 1 compared with group 2, (15.11% versus 14.04%, $P = .017$) and above normal ranges. Wang et al [15] reported that, even if RDW was known as a marker of systemic inflammation with prognostic significance for cancers, together with NLR and PLR, in cervical cancers RDW was uninformative. Yayla Abide et al [16] reported RDW measurements significantly lower in patients with endometrial carcinoma compared with endometrial hyperplasia patients or healthy subjects. Nobody has studied RDW-CV in uterine leiomyoma patients thus far.

The mean value for HCT was lower, but not significantly lower, in group 1 compared with group 2, (35.64% versus 37.28%, $P = .131$) and

below normal ranges, due to the blood losses associated with leiomyomas. As stated above, only in myomatous erythrocytosis syndrome, hematocrit was found to be higher than normal, 59.1%,⁶ and we found no such case in our study group.

The mean value for PLT was significantly higher in group 1 compared with group 2 ($315.5 \times 10^3/\mu\text{L}$ versus $285.35 \times 10^3/\mu\text{L}$, $P = .050$), which was due to the permanent blood losses. Platelet count could be normal in leiomyomas [17] Few cases of PLT count lower than normal, in consumptive coagulopathies, have been reported in leiomyomas associated with pregnancy [18,19] or not [20-22]. Moreover, Liang et al [23] and Suo et al [24] demonstrated that platelet-derived growth factor was involved in the development of human fibroids.

The mean value for MPV was higher, but not significantly higher, in group 1 compared with group 2 ($8.61 \times 10^{-15}\text{L}$ versus $7.94 \times 10^{-15}\text{L}$, $P = .083$). Aricigil et al [25] found no correlation between MPV and metastasis in nasopharyngeal cancer. Li H et al [26] found no correlation between MPV and disease stage in osteosarcoma. Dincel [27] found no correlation between MPV and papillary thyroid carcinoma. However, Li S et al [28] found a significant correlation between diabetic retinopathy and MPV. Shilpi and Potekar [29] found MPV higher in diabetic patients with complications compared with those without complications. Liang et al [30] reported close correlations between MPV and RDW in acute myocardial infarction. We also found increased values of RDW and MPV in leiomyoma patients. Ersoy et al [31] reported significantly lower MPV values in patients with placenta previa. Yücel and Ustun [32] found MPV significantly higher in patients with preeclampsia. Karateke et al [33] reported the highest MPV, PDW, and PCT values in the endometrial cancer group, increased values in endometrial hyperplasia, and the lowest values in healthy patients. No one has reported MPV values in leiomyoma patients thus far.

The mean value for PDW was lower, but not significantly lower, in group 1 compared with group 2 (16.29% versus 17.68%, $P = .084$). Shilpi and Potekar [29] found significantly increased MPV, PDW, and P-LCR values in diabetic compared with nondiabetic patients, and higher in those with complications compared with those without complications. We report decreased values of PDW in leiomyoma patients.

Dincel and Bayraktar [27] reported significantly decreased PDW values in papillary thyroid carcinoma cancers, compared with multinodular goiter or healthy patients. No one has reported PDW values in leiomyoma patients so far.

The mean value for PCT was significantly higher in group 1 compared with group 2 (0.27% versus 0.23%, $P = .001$). Dincel and Bayraktar [27] reported significantly increased PCT values in papillary thyroid carcinoma patients, compared with multi-nodular goiter patients or healthy patients. Yücel and Ustun [32] reported significantly decreased PCT values in severe preeclampsia patients compared with healthy pregnant patients. Peng et al [34] demonstrated that higher PCT and PLT may be associated with higher risk for cardiovascular mortality in peritoneal dialysis patients. Isik et al [35] showed that PCR was significantly higher in preterm delivery patients, compared with patients who delivered at term. Karateke et al [33] reported the highest levels of PCT, PDW, and MPV in endometrial cancer, compared with the endometrial hyperplasia and control groups. Nobody reported PCT values in leiomyoma. We report significantly increased values of PCT in uterine leiomyoma patients.

The mean value for P-LCR was higher, but not significantly higher, in group 1 compared with group 2 (25.63% versus 21.63%, $P = .116$). Ersoy et al [31] reported lower MPV and P-LCR in placenta previa compared with control groups, with regard to third trimester values. With increasing platelet counts, Sarangi et al [36] reported a decrease in MPV, P-LCR and PDW in children with thrombocytosis. Shilpi and Potekar [29] reported P-LCR, MPV and PDW to be significantly higher in diabetic compared with nondiabetic subjects and significantly higher in those with complications compared with those without complications. No one has reported P-LCR values in leiomyoma.

The mean value for NLR was higher, but not significantly higher in group 1 compared with group 2 (2.11 versus 2.09, $P = .573$). Isik et al [35] reported significantly higher NLR in preterm delivery patients compared with at-term delivery patients. Aricigil et al [25] reported NLR to be significantly higher in patients with nasopharyngeal cancer compared with healthy patients. In patients with metastatic colorectal cancer, Song et al [37] reported a significant association between NLR and decreased survival time. Neal et al [38] reported high preoperative NLR as an independent prognostic

factor for a poor outcome in patients with colorectal liver metastases. Kwon et al [39] reported NLR and PLR as good prognostic markers of overall survival in patients with operable colorectal cancer and NLR and PLR positively correlated in these patients. Yang et al [40] demonstrated that NLR and PLR exhibit favorable diagnostic performance in predicting pulmonary involvement and disease activity in patients with dermatomyositis. Prodromidou et al [41] found NLR and PLR to have limited sensitivity and specificity in detecting ovarian cancer, although their values deviated from values of healthy controls. Mazza et al [42] reported higher NLR in bipolar disorder and major depressive disorder compared with healthy controls. Durmus et al [43] found NLR and PLR significantly higher in patients with heart failure compared with controls. Nobody reported NLR in leiomyoma.

The mean value for PLR was higher, but not significantly higher, in group 1 compared with group 2 (145.47 versus 133.54, $P = .101$). Yang et al [40] found PLR as a possible predictive factor in pulmonary involvement in dermatomyositis patients. Huang et al [44], Song et al [37], Neal et al [38] and Kwon et al [39] reported PLR as a prognostic factor in colorectal patients. Machairas et al [45] reported elevated PLR and PCT in cases of extrathyroidal extension of papillary thyroid carcinoma and in T3 tumors. Tayfur et al. [46] reported PLR and PCT to be as effective inflammatory markers for predicting the presence of hematemesis gravidarum. Kalemci et al. [47] reported significantly increased PLR, PDW, PCT, MPV and RDW in chronic obstructive lung disease. No one has reported PLR in leiomyoma.

Our study has several limitations. First of all, further studies on more numerous patients are required to confirm these results. Second, studies with more numerous patients are required to investigate the possible correlations between RDW-CV, PLT and PCT values and the number, size and location of uterine leiomyomas. Other studies are also required to investigate whether this difference was generated by bleeding or by fibroma itself. Another study should be performed to see if and when these values would return to normal after the surgical procedure for removing leiomyomas, and if there are differences in recovering of the normal values depending on the type of surgical procedure: total hysterectomy, subtotal hysterectomy or myomectomy.

5. CONCLUSION

The values of RDW-CV, PLT, and PCT were significantly ($P = .017$, $P = .05$, $P = .001$, respectively) higher in leiomyoma patients, whereas WBC, RBC, HCT, MPV, PDW, P-LCR, NLR and PLR were not significantly different compared with patients with other severe gynecological diseases. Still, the specificity of RDW-CV, PLT and PCT was not high enough to allow using them as diagnostic tools for leiomyoma. The inflammatory indices WBC, NLR, PLR were not significantly higher in leiomyoma patients, which did not favor the idea that leiomyoma had an inflammatory cause, too. Because leiomyomas were accompanied by acute or chronic blood loss, HCT should have been lower, but it was not, and RDW-CV was significantly higher ($P = .017$) than in patients with other severe gynecological diseases, although the RBC number was not significantly different.

CONSENT

Informed consent was obtained from all the patients upon hospital admission.

ETHICAL APPROVAL

This study received the Elena Doamna Obstetrics and Gynecology University Hospital Research Ethics Committee Approval number 1 from January 15th, 2020.

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COMPETING INTERESTS

Authors have declared that no competing interests exist.

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