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Using Platelet-rich Plasma for the Treatment of Cervical Ectopy

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Abstract

Background: In a condition described as cervical ectopy, glandular cells (also known as columnar epithelium) from the 'inside' of the cervical canal are found on the 'outside' of the vaginal section of the cervix. Autologous platelet-rich plasma (PRP) has gained popularity in the disciplines of orthopedics, dentistry, dermatology, ophthalmology, and esthetic surgery during the last few years. PRP, a platelet concentration, includes many growth factors that significantly aid tissue repair.

Patients and methods: This observational research was carried out on 40 women who visited Gynecological Clinic at Al-Hussein Hospital and 6th of October Hospital. All the women present with symptomatic cervical erosion and diagnosed as cervical ectopy by vaginal examination. The duration of the study ranged from 24 to 30 months.

Results: Forty percent of the women showed marked improvement whereas 35% of the women showed no improvement all. There were 22.5% who showed decrease in the lesion size to 1–2 cm and only 2.5% showed decrease in the lesion size to 2–3 cm.

Conclusion: The current study's findings suggested that PRP, particularly for the smaller lesions, may become the preferred therapy for cervical ectopy in symptomatic women.

Keywords: Cervical ectopy, Cervix, Platelet-rich plasma

1. Introduction

A condition known as cervical ectopy occurs when the glandular cells (also known as columnar epithelium) from the cervical canal are found on the vaginal region of the cervix's 'outside.' Squamous epithelial cells are the cells found 'outside' of the cervix. The transformation zone, also described as the stratified squamous epithelium, is the area where the two cells converge. Even though it is not abnormal, this condition looks exactly like an early cervical canal.¹

Before puberty, it developed at the external os, where the stratified squamous cover of the ectocervix meets the columnar secretory epithelium of the endocervical canal. The cervical os opens during cervical ectropion, which is brought on by rising estrogen levels throughout adolescence, exposing the endocervical columnar epithelium onto the

ectocervix. An ectropion is a region of red, raw skin formed by these columnar cells on the ectocervix (cervical erosion). Then, after being exposed to the acidic environment of the vagina, it undergoes squamous metaplasia and develops into stratified squamous epithelium.²

When a vaginal check (or pap smear test) is performed, it could be discovered by accident. Autologous platelet-rich plasma (PRP) has gained popularity in the disciplines of orthopedics, dentistry, dermatology, ophthalmology, and esthetic surgery in recent years.³

PRP, which is a concentrate of platelets, includes a number of growth factors that help tissue repair by boosting cellular chemotaxis, removing tissue debris, cell development and differentiation, angiogenesis, and laying down extracellular matrix.^{4,5}

Vascular endothelial growth factor, insulin-like growth factors, transforming growth factor- β , basic

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fibroblast growth factor, and platelet-derived growth factor are only a few of the many growth factors found in high concentrations in PRP.⁶

PRP's gel-like consistency significantly contributes to tissue healing by speeding angiogenesis and lowering inflammatory response. In addition, since autologous blood is used, patients are not at danger for contracting HIV or hepatitis, nor are they at risk for developing immunogenic responses as may happen with allografts or xenografts. The possible hazards of PRP also seem to be quite minimal based on medical ideas and the few published research on the subject.⁷

Clinical investigations have shown that the administration of PRP to soft-tissue wounds improves healing because these proteins are histopromotive. For these reasons, it was plausible that administering autologous growth factors through a PRP gel directly to the ectopic cervix would be advantageous.⁸

A straightforward, inexpensive, noninvasive, and natural technique to guarantee an adequate local concentration of autologous growth factors is to apply autologous PRP to sick tissue. This approach shows potential.⁹

This study's objective was to assess the therapeutic value of using an autologous PRP gel on degraded cervical tissue in symptomatic women.

2. Patients and methods

This was approved by faculty counsel. This was an observational research conducted at the outpatient of Gynecologic Clinic at Al-Hussein Hospital and 6th of October Hospital in the period from August 2019 to November 2021. We examined 60 cases had a clinical picture of chronic cervicitis and only 43 of them had cervical ectopy during cervical examination (40 women of them completed treatment and observation and three did not).

All women aged 20–40 years old and presented with one or more of the clinical pictures of chronic cervicitis were included in the study. Women who had dysplastic or neoplastic cells, were pregnant or nursing, used hormonal contraception, had a high number of leucocytes in the vaginal smear (typically >30 per high power field), and were hesitant to return for follow-up appointments were excluded from the research.

Every patient has to submit complete history, a vaginal evaluation, a cervical evaluation, and an assessment of the OS's form, contour, and degree of erosion (patulous, scarred, parous, nonparous), measurement of the eroded region anteriorly, including external OS, a colposcopy to rule out

dysplastic or cancerous cells, and a cervical smear test.

Forty consecutive eligible patients were thereafter allocated to the PRP in an alternating fashion. Venous blood (60 ml) was drawn from the patient's arm and placed in anticoagulant-containing sodium sulphate 3.2% tubes. The blood was then centrifuged at 1200 rpm for 12 min to separate it into three layers: an upper layer that is composed of platelets and white blood cells, a middle thin layer that is rich in white blood cells, and a bottom layer that is composed of red blood cells. In order to aid in the development of soft pellets (erythrocytes and platelets) at the bottom of the tube, the plasma was centrifuged once more for 7 min at 3300 rpm. Leukocyte PRP was created by homogenizing the pellets in the lowest third (5 ml) of the plasma before being administered. To be applied twice, the PRP concentrate was split into two pieces of 4–5 ml each. One was used right away, the other was kept at –30 °C, and the second application was given to the patient in the same method 7 days later.

The cervical erosion was coated with PRP gel using a double syringe, one carrying PRP and the other containing calcium chloride, during the PRP injection. The patient was then put in a sitting lithotomy posture. For 15 min, the patient stayed in the lithotomy posture in the sitting to keep the PRP gel on the cervical surface. After 7 days, a second application was made.

On the day of treatment, the patients were sent home with instructions to refrain from sexual activity and vaginal douching for a month. At the conclusion of the second, fourth, sixth, eighth, tenth, and twelfth weeks after treatment, follow-up appointments were held. At each appointment, all patients got a vaginal examination to determine the extent of the eroded region, the extent of the symptoms, and the incidence of side effects.

Utilizing Microsoft Excel software, data gathered throughout time, basic clinical examinations, laboratory testing, and outcome measures were coded, recorded, and analyzed. Following that, data were added to the statistical analysis program Statistical Package for the Social Sciences (SPSS version 20.0; SPSS Inc., Chicago, Illinois, USA).

3. Results

The mean age was 32.20 ± 6.28 years. The commonest age group presented was 26–30 years (37.5%). The majority of women (80%) were married (Table 1).

Table 1. Distribution of patients regarding demographic data.

Demographic data	Studied patients (N = 40) [n (%)]
Age (years)	
Range	22.0–40.0
Mean \pm SD	31.83 \pm 5.61
Median	31.0
Age groups (years)	
20–25	4 (10.0)
26–30	15 (37.5)
31–35	10 (25.0)
36–40	11 (27.5)
Parity	
Range	0.0–6.0
Mean \pm SD	2.35 \pm 1.53
Median	2.0
P0	6 (15.0)
P1	5 (12.5)
P2	11 (27.5)
P3	9 (22.5)
P4	6 (15.0)
P5	2 (5.0)
P6	1 (2.5)
Marital status	
Married	32 (80.0)
Divorced	5 (12.5)
Widow	3 (7.5)

Table 2. Comparison of clinical presentation before and after platelet-rich plasma treatment.

	Before treatment [n (%)]	After treatment [n (%)]	P value
Vaginal discharge	25 (62.5)	5 (12.5)	<0.001
Contact bleeding	8 (20.0)	2 (5.0)	0.070
History of recurrent cervicitis	19 (47.5)	4 (21.1)	<0.001
Pelvic pain	14 (35.0)	2 (14)	<0.001

Table 2 shows that there was highly substantial increase in vaginal discharge, recurrent cervicitis, and pelvic pain after PRP treatment ($P < 0.001$).

Table 3 shows that there was highly significant improvement in size of lesion after treatment ($P < 0.001$).

There were no complications observed in the studied women during the period of treatment (Table 4).

Table 3. Comparison of the size of cervical ectopy before and after platelet-rich plasma treatment.

Size of lesion	After treatment					P value
	Total number [n (%)]	Markedly improved [n (%)]	Reduced up to 1–2 cm [n (%)]	Reduced to 2–3 cm [n (%)]	Not improved [n (%)]	
Before treatment						<0.001
≤ 2 cm	21 (52.5)	15 (71.5)	6 (28.5)	0	0	
>2 –3 cm	11 (27.5)	1 (9)	5 (45.5)	0	5 (45.5)	
>3 cm and not improved	8 (20)	0	4 (50)	1 (12.5)	3 (37.5)	

Table 4. Distribution of complications among the studied patients.

Parameters	Studied women (N = 40) [n (%)]
Complications	40 (100.0)
No	0
Yes	
Pain during the procedure	
Bleeding during the technique	
Cervical stenosis	
Post-follow-up complaint of discomfort or dyspareunia	

The previous table showed that there was no substantial connection between the outcome of studied patients and their demographic date, size of eroded area, and clinical presentation (pelvic discomfort, contact hemorrhage, recurrent cervicitis, and vaginal discharge) (Table 5).

4. Discussion

A physiological condition called cervical ectopy is brought on by columnar epithelium from the cervical canal spreading into the vaginal part of the cervix.¹⁰

This study's primary goal was to assess the therapeutic value of using an autologous PRP gel on degraded cervical tissue in symptomatic women.

This observational research was carried out on 40 women attended to Gynecological Clinic at Al-Hussein Hospital and 6th of October Hospital. All the women present with symptomatic cervical erosion and diagnosed cervical ectopy by vaginal examination. The duration of the study ranged from 26 to 30 months.

The patients that were examined varied in age from 22 to 40, with an average age of 32.20 ± 6.28 years. The main parity was 2.35 ± 1.53 . Most women (80%) were married, five (12.5%) were divorced and three (7.5%) women were widow.

Our results were in line with studies of Hashmi et al.,¹¹ Mirza et al.,¹² and Patil and Sharma¹³ correspondingly, showed 44% in 31–35 years, showed 39.2% in 31–40 years, and showed 40% in 26–30 years.

Our findings were corroborated by research of Hua et al.⁸ revealed that the PRP group's average

Table 5. Relation of demographic data, size of eroded area, and clinical presentation between the improved and nonimproved ectopy after platelet-rich plasma treatment.

	Nonimproved (N = 14) [n (%)]	Improved (N = 26) [n (%)]	P value
Age groups (years)			
20–25	1 (7.1)	3 (11.5)	0.652
26–30	4 (28.6)	11 (42.3)	
31–35	5 (35.7)	5 (19.2)	
36–40	4 (28.6)	7 (26.9)	
Age (years)			
Range	22.0–40.0	23.0–40.0	0.624
Mean ± SD	32.43 ± 5.89	31.50 ± 5.54	
Median	33.5	30.0	
Parity			
Range	0.0–5.0	0.0–6.0	0.508
Mean ± SD	2.573 ± 1.50	2.23 ± 1.56	
Median	2.0	2.0	
P0	1 (7.1)	5 (19.2)	0.382
P1	2 (14.3)	3 (11.5)	
P2	5 (35.7)	6 (23.1)	
P3	2 (14.3)	7 (26.9)	
P4	2 (14.3)	4 (15.4)	
P5	2 (14.3)	0	
P6	0	1 (3.8)	
Marital status			
Married	11 (78.6)	21 (80.8)	0.968
Divorced	2 (14.3)	3 (11.5)	
Widow	1 (7.1)	2 (7.7)	
Lesion size			
≤2 cm	6 (42.9)	15 (57.7)	0.628
>2–3 cm	5 (35.7)	6 (23.1)	
>3 cm	3 (21.4)	5 (19.2)	
Vaginal discharge			
Absent	5 (35.7)	10 (38.5)	0.864
Present	9 (64.3)	16 (61.5)	
Contact bleeding			
Absent	10 (71.4)	22 (84.6)	0.320
Present	4 (28.6)	4 (15.4)	
History of recurrent cervicitis			
Absent	7 (50.0)	14 (53.8)	0.816
Present	7 (50.0)	12 (46.2)	
Pelvic pain			
Absent	7 (50.0)	19 (73.1)	0.144
Present	7 (50.0)	7 (26.9)	

age was 35.1 ± 4.39 years, and its mean parity was 1.15 ± 0.44 .

Also, in the research of Sharma et al.,¹⁴ the median age of females with cervical ectopy was 31.2 ± 7.6 years and the mean of parity was 1.9 ± 1.5 .

Furthermore, Shazamani et al.¹⁵ revealed that the bulk of the patients (63.3%) were between the ages of 31 and 40 years. With the previous investigations, the current study's findings are consistent. According to available data, cervical ectopy is frequent among women who are fertile.

The present study showed that the commonest symptom in the studied women suffering from cervical ectopy were vaginal discharge that varied between light mucus discharge with or without

spotting between periods in 62.5% of women, recurrent cervicitis in 47.5% of women, pelvic pain in 35% and lastly contact bleeding in only 20% of women. Nearly half of the studied cases (52.5%) had lesions sized less than or equal to 2 cm. It was more than 2–3 cm in 11 (27.5%) women and more than 3–4 cm in eight (20%) women.

In accordance with our results, Jain et al.¹⁶ as they reported that in the PRP group, 96.67% of patients had dyspareunia, 91.67% had itching, and 90.0% had white discharge. Seventy-five percent of patients report pelvic discomfort, 70% have menstrual cramps, 63.33% experience postcoital bleeding, and 58.33% report perineum heaviness.

Moreover, in the study of Agah et al.,¹⁷ the commonest symptoms in women suffering from cervical ectopy were leucorrhoea followed by vaginal itching and pruritus and pelvic pain.

According to Shazamani et al.,¹⁵ at the beginning of treatment, all patients reported vaginal discharge. In their research, 25 (83.4%) of the 30 patients experienced contact bleeding.

Whereas, in the study of Hua et al.,⁸ the majority of PRP group had size of lesion 2–3 cm. The most common symptoms were vaginal discharge followed by pelvic pain, postcoital bleeding and recurrent cervicitis.

The present study showed that the marked improvement of cervical ectopy after PRP application was more (71.5%) in the smaller sized ectopy (<2 cm) than the larger one (>3 cm). There was highly significant failure of cervical ectopy improvement after PRP application in (45.5%) of ectopy sized area >2–3 cm and in (37.5%) of size more than 3 cm. These results were highly significant ($P < 0.001$).

Vaginal discharge was cured in 20 women, while there was no improvement in 5 cases. Contact bleeding was cured in 6 women, while there was no improvement in 2 cases. 15 women experienced cure from recurrent cervicitis while only 4 (21.1%) women did not improve. The studied women with pelvic pain showed decrease in pain in 12 cases while it still the same after treatment in two. There was highly substantial increase in vaginal discharge, recurrent cervicitis, and pelvic pain after treatment ($P < 0.001$). On the other hand, no substantial increase in contact bleeding ($P = 0.07$).

Hua et al.⁸ Compare the therapeutic efficacy of autologous PRP gel application to laser on the degraded cervical region in symptomatic women. By the conclusion of the 12-week follow-up, 44 patients (89.8%) had been cured and 2 (4.1%) had shown significantly improved results in the PRP group, while 43 patients (91.5%) had been cured and

2 (4.3%) had shown significantly improved results in the laser group. In the PRP and laser groups, respectively, the therapy was successful for 46 (93.9%) and 45 (95.7%) patients overall, and the variation in the rates was not statistically substantial ($P > 0.05$). Similarly, 59 patients (93.7%) in the PRP group and 60 (92.4%) in the laser group had no symptoms, and there was no statistically substantial variation between the two rates ($P > 0.05$). On the other hand, colposcopy data showed that the PRP group's mean time to complete re-epithelialization was 6.41 ± 2.05 weeks, whereas the laser group's was 8.28 ± 1.72 weeks. This variation was substantial ($P < 0.05$), according to the data.

Our results showed that as regard complications: there were no complications observed in the studied women during the period of treatment such as pain during the procedure, bleeding during the technique, cervical stenosis or post-follow-up complaint of discomfort or dyspareunia.

Our findings were corroborated by research of Hua et al.⁸ revealed that Additionally, the frequencies of unfavorable treatment effects were compared. Neither the PRP applications nor the laser therapy caused any issues throughout the observation period. In 25 individuals in the PRP group, vaginal discharge was seen, however it was less frequent and lasted less time than in the laser group. Nearly all of the patients in that group had a vaginal discharge in response to the medication. In the PRP group, there were 11 instances of minor bleeding that spontaneously ended within a week, but there were no instances of significant vaginal hemorrhage. However, there were 25 episodes of vaginal bleeding in the laser group, including 2 cases of significant bleeding that required vaginal tamponade therapy. In addition, 1 patient in this group received oral antibiotic treatment due to an offensive discharge.

According to Hua et al.,⁸ with lower adverse treatment effects including vaginal discharge and vaginal hemorrhage, recovery was quicker in the PRP group. These two factors collaborated to produce these findings. White blood cells, whose density is comparable to that of platelets, collect in the same layer during centrifugation, making PRP a concentration of both white blood cells and platelets. PRP is not only known to enhance wound healing. The white blood cells phagocytize microorganisms, remove debris from decomposing tissues, and reduce inflammation.

Bielecki et al.,¹⁸ observed that *Staphylococcus aureus* and *Escherichia coli* were both suppressed by PRP.

In the present research, on trying to find a relationship in the demographic data (age, parity, and

maternal state), size of the eroded area and clinical presentations between the improved and non-improved cervical ectopy after PRP treatment, we found no significant relation.

4.1. Conclusion

We concluded that autologous PRP treatment for cervical ectopy appeared promising in symptomatic women as it yields tissue healing and improvement in clinical presentations without adverse effects. PRP application for cervical ectopy were encouraging in 65% of case with fully repaired cervical epithelium in 40% of cases and reduction of eroded areas in 25% of the studied women. Also, rapid and better healing of eroded cervix was noticed in smaller sized area than larger one. We also concluded that there were no adverse treatment effects of PRP treatment of cervical ectopy. PRP treatment of cervical ectopy ensured complete presentation of the physiological characteristics and function of the cervix.

Conflicts of interest

There are no conflicts of interest.

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