

Prevalence of telogen effluvium in Egyptian women with post covid 19 viral infections compared to post-partum telogen effluvium

Abstract

- **Introduction:** Telogen effluvium is considered if the hair shedding occurs within three months of the triggering factor. it is self-limited lasting about 6 months. Post-partum TE is reported as hair loss postpartum and it is usually overestimated due to associated stress and psychological problems. Post-acute COVID-19 is a syndrome characterized by the persistence of clinical symptoms beyond four weeks after the onset of acute symptoms. **Aim:** To highlight the prevalence of telogen effluvium in Egyptian women with post-Covid 19 viral infections compared to post-partum telogen effluvium. **Methods:** This comparative study This study is comparative study was conducted on 50 female patients diagnosed with COVID-19 viral infections in the previous few weeks to months and another 50 post-partum females. Written consent will be obtained from all participants in the study. **Results:** 70.6% of the post-covid cases had normal trichoscopic findings compared to 33.4% of postpartum cases, and 29.4% of post-covid cases had abnormal trichoscopic findings compared to 66.6% of postpartum cases. The empty follicles and reduction in hair follicle density is the main trichoscopic finding in post covid cases (84%, and 70 % respectively) compared to upright regrowing hair in postpartum cases 77%. **Conclusion:** TE can be considered one of the symptoms of post-covid syndrome as well as post-partum hair loss in Egyptian females.

Key words: post-covid syndrome, post-covid Telogen effluvium, post-partum Telogen effluvium

Introduction:

Three months following a triggering event, telogen effluvium (TE), a self-limited stress-related diffuse pattern loss, develops. Many stress types have been linked to TE, including febrile episodes, acute infection, nutritional deficits (which are frequent in COVID-19 patients), psychological stress, major operation, or hormonal disturbances [1]. After delivery, postpartum TE (PPTE) is typically described as hair loss. Human chorionic gonadotropin reaches its peak at two months, progesterone gradually rises ninefold, and estrogens rise eightfold during pregnancy. Within 2-4 days after delivery, normalization of female hormones increases at term up to 20 fold, It is believed that TE can be explained by these variations in hormone levels in postpartum women [2].

Three stages in hair cycle: anagen, catagen and telogen. The phases last, respectively, 2–6 years, a few weeks, and three months. TE is caused by an irregular hair cycle in which the follicles enter the telogen phase early and the growth phase declines. Consequently, within months, shedding increases [3].

A worrying global pandemic is COVID-19. Fever and respiratory problems are frequent symptoms. Additionally, extrapulmonary symptoms associated with dermatology have been identified in recent research. Telogen effluvium is one of these that is connected to symptoms of post-covid. Due to the virus' disruption of stress and physiological parameters, COVID-19 affects several alopecia-related illnesses, including androgenetic alopecia, alopecia areata, and telogen effluvium [4]. According to a study, COVID-19 may have a major impact by influencing the transmembrane protease serine 2 (TMPRSS2) gene, a crucial gene in androgen pathways aggravating alopecia [5]. **The Aim of this study is To highlight the prevalence of telogen effluvium in Egyptian women with post-Covid 19 viral infections compared to post-partum telogen effluvium.**

Materials and methods

Research design

the study was applied to 50 female patients diagnosed with COVID-19 viral infections in the previous few weeks to months and another 50 postpartum females. The patients were collected from Al-Azhar University hospitals. Written consent will be obtained from all participants in the study.

Data collection

Some of the data was collected retrospectively. In group 1, The demographic data, signs, and symptoms of COVID-19, past medical history, drug history, and dermatologic manifestations were reviewed by convenience sampling. Also, disease severity based on radiological and laboratory findings was collected from their medical records. In group 2, The date of delivery, delivery history, past medical history, and drug history a questionnaire was done for family, drug, and hair loss history completed by phone after discharge.

Statistical analysis

Qualitative data were expressed by ratio and percentage, and quantitative data by mean and standard deviation. Data were fed to the computer and analyzed using IBM SPSS software package version 20.0. (Armonk, NY: IBM Corp.) Qualitative data were described using numbers and percentages. The Kolmogorov-Smirnov test was used to verify the normality of the distribution. The significance of the obtained results was judged at the 5% level. The tests used were: 1: Chi-square test for categorical variables to compare between different groups 2: Monte Carlo correction for chi-square when more than 20% of the cells have an expected count less than 5. significance is considered when the p-value is less than 0.05

Results

The mean age of both studied groups was 34.94 (\pm 12.97) SD with a range (18.0 - 70.0)(Table-1). The hair pull test was positive in 66% of post-covid cases compared to 27% in postpartum cases (Table-2).

As regard the trichoscopic findings of the two studied groups there are 70.6% of the post covid cases had normal trichoscopic findings compared to 33.4% of postpartum cases and 29.4% of post-covid cases had abnormal trichoscopic findings compared to 66.6% of postpartum cases (Table-3).

The empty follicles and reduction in hair follicle density is the main trichoscopic finding in post covid cases (84%, 70% respectively) compared to upright regrowing hair in postpartum cases 77% (Table-4, figure 1,2)

Table (1): Table(1):demographic data of the studied groups

	Min. – Max.	Mean ± SD.	Median (IQR)
Age (years)	18.0 - 70.0	34.94 ± 12.97	33.0 (24.0 - 45.0)

IQR: Inter quartile range

SD: Standard deviation

Table(2): hair pull test in the studied groups

Hair pull test	Post covid 19 TE (50 pts)	Postpartum TE (50 pts)
Positive	33(66%)	27 (54%)
Negative	17 (34%)	23(46%)

Table(3): Trichoscopic findings of the two studied groups

Trichoscopic findings:	Post covid 19 TE (50 pts)	Postpartum TE (50 pts)	P value
Normal findings	70.6%	33.4%	0.001*
Abnormal findings	29.4%	66.6%	0.001*

Table-4: comparison between abnormal trichoscopic findings in the two studied groups

Trichoscopic findings:	Post covid 19 TE (50 pts)	Postpartum TE (50 pts)	P value
Reduction in hair follicle density	70%	46%	0.001*
Empty follicles	84%	36%	0.001*

Upright regrowing hairs	32%	77%	0.001*
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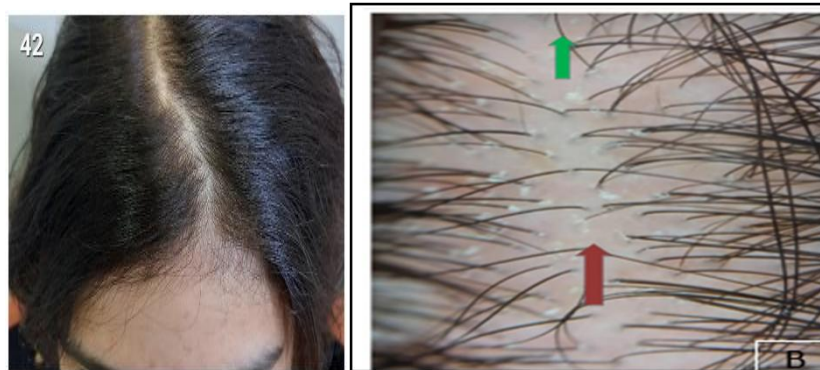


Fig.1. (a) A 28 –years old woman with post covid TE (x50)s (b) Trichoscopy showing features of telogen effluvium in the form of empty follicles (red arrows) and short regrowing upright hair (green arrows)

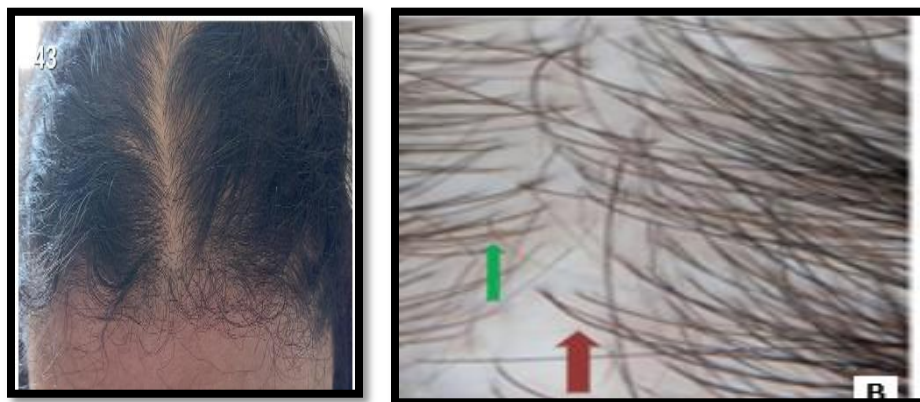


Fig. 2. (a) A 38-years old woman with post partum TE (x50)s (b) Trichoscopy showing features of telogeneffluvium in the form of empty hair follicles (red arrows) and short regrowing hair (green arrow)s

Discussion

Fever and pulmonary signs are two of the more typical COVID-19 symptoms. Additionally, telogen effluvium was mentioned in a few studies related to COVID-19 [5]. Telogen effluvium is a type of generalized hair loss that occurs Several weeks following stress, Systemic infection, pregnancy, psychological trauma, surgery, starvation, and medicines are the inciting elements

that lead to early termination of the anagen phase and hair shedding. Scarring is uncommon, and TE is a self-limiting condition [6].

Ten cases of TE post-COVID-19 infection were reported in the study of Olds et al. [7]. The majority were women. The size of the sample is one of this study's disadvantages. According to what we know, earlier studies were case reports or case series [8].

The most frequent cause of diffuse hair shedding is telogen effluvium, which results from the premature end of anagen and the entry of the hair follicle into catagen. One potential cause of significant hair shedding is COVID-19. Tumor necrosis factor, interleukin 1b, interleukin 6, and interferon types 1 and 2 were among the proinflammatory cytokines with increased levels in SARS-CoV-2 patients, according to research [9]. According to earlier research, severe COVID-19 had higher levels of cytokines. An increased risk of TE may be associated with higher cytokine levels. In experimental investigations, inflammatory cytokines such as IL-6, TNF, IL-1, and IFN γ promote the catagen cycle [10].

In addition, the anticoagulation cascade in response to COVID-19 causes a reduction in anticoagulant proteins. It could lead to the development of microthrombi and prevent blood flow to the hair follicles. These variables may be regarded as TE following COVID-19 infection precipitating variables [11, 12]. A few weeks following COVID-19's clinical manifestation, the hair loss symptom started to appear. According to the Di Landro et al. study, iron profile, and thyroid function were normal in all patients. However, hair thinning, and hair loss were their main complaints [9].

The study of **Gupta, G., et al., [13]** and **Goldust, et al., [14]** show that the scalp lost a lot of hair several weeks to months following infections similar to the findings in this study, and the same method of diagnosing hair loss was used. [13, 14]. Twenty patients (all were women) were enrolled in the study by **Shome et al., [15]** commencing a few weeks after they had recovered from their COVID-19 infection and continuing for more than six months. All were diagnosed with telogen effluvium which improved when most of the post covid patients develop hair regrowth and decrease hair loss within 6 months, and 89% of patients displayed great hair growth.

According to **Sharquie et al., [16]** three males and thirty-six females with post covid infection within three months after Covid-19 infection, they all experienced significant hair loss. The results of the tests were very promising (>10–50% on and enhancement that lasted even after treatment. After the eighth session of mesotherapy.

In the review article comprising 465 patients with acute TE 67.5% of the population was female, with a mean age of 44. A decrease in hair density, empty hair, or the regrowth of short hairs is the three most frequent trichoscopic observations. the manifestation of telogen effluvium is for 74 days. In contrast to classic acute TE, the average time between the development of COVID-19 symptoms and the manifestation of acute TE is 74 days. While most patients regain their hair, others do not.

Data on 128 patients were supplied by **Strace et al.** 66.3% of patients had telogen alopecia, while 58.4% had trichodynia. In 42.4% of cases, trichodynia was linked to telogen effluvium, and in 66.1%, 44.1%, and 44.1% of cases, anosmia, and eosinophilia, respectively. Within the first month of receiving a COVID-19 diagnosis, most patients (62.5%) and 47.8%, respectively, exhibited hair-related signs and symptoms. after a minimum of 12 weeks [18].

The postpartum telogen effluvium (PPTE) is usually underestimated and it is difficult to be evaluated Since there are many hormonal, dietary, and uncontrollable differences between women, also it is impossible to compare the results biologically because they come from different women at various stages of a postpartum, history of disease or drugs causing hair loss, family history of hair disorders, based on a questionnaire completed by phone after discharge, combined data from the same lady with data from other women, compared all of them, and then tested for significance using statistics. Additionally, the method is observer-dependent because it may be challenging to count hundred hairs in the microscopic examination of the patient to avoid any potential unconscious counting bias.

The results of postpartum telogen effluvium in our study which were about 66% of patients were similar to **Lynfield et al.**, [19] study was investigated at 6 weeks postpartum and 5 at 3 months postpartum. The information collected before and following pregnancy did not come from the same women. Only the information from nine women was collected post partum after 6 weeks or 3 moths, the trichogram of these 9 women revealed that 7 had a reversed anagen catagen ratio. Only 4 of the 26 women reported having clinical hair loss, while 6 did not, after a minimum of 12 weeks.

The study of **Ekmeci et al.** [20] deduced that the 4-month postpartum group differs statistically significantly from all other groups. The mean difference was roughly an anagen rate of 81.43 in the other periods and 78.47 at 4 months postpartum. The authors added a seasonal shedding element that could be a factor in the reported group differences but did not specify precisely when the data were taken for each woman in the study.

The study of Ekmekci et al. confirms that summer was not included in the study, there is still significant hair shedding in the fall and spring, which may have contributed to the rise in the telogen rate as reported in the systematic review of Malkud, et al.,[21] Seasonal changes are known to affect the hair cycle, which may lead to an increase in TE.

To determine whether the difference was corresponds to the women's clinical hair loss sensation, it may also be helpful to know whether each patient felt that PPTE was happening to them and when. The study has several restrictions. First of all, the study is merely retrospective, and the sample size was small.

To the best of our knowledge, this is the first comparative study of TE caused by COVID-19 and PPTE in Egypt. In contrast to prior studies, ours had fewer demographic data points.

It is possible that certain drugs could cause TE. Azithromycin, hydroxychloroquine, and other medications used to treat COVID-19 can cause TE. A significant additional cause of stress is the pandemic's emotional and psychological impacts, which could lead to an overall rise in TE [13].

The findings of this study emphasize the necessity of considering COVID-19 acute TE in individuals with hair loss who have a history of COVID-19 infection. Despite the self-limiting nature of the illness, COVID-19's stressful expression is hair loss. Doctors can provide patients with advice and reduce their tension by pointing out the covid-19 may be implicated in the pathogenesis of acute TE. To confirm TE after pregnancy, a better strategy and more studies have to be employed.

CONCLUSION

- Postpartum and post covid telogen effluvium have not been the focus on most of researches. High prevalence of post covid telogen effluvium in Egyptian females compared to post stress and post-partum telogen effluvium, TE can be considered one of the symptoms of post-covid syndrome as well as post-partum hair loss in Egyptian females.

Ethical Approval:

As per international standard or university standard written ethical approval has been collected and preserved by the author(s).

Consent

Written consent will be obtained from all participants in the study.

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