### INTRODUCTION

White piedra is a superficial fungal infection of the hair shafts, resulting in the formation of soft, white, gray, or brown superficial nodules. It was thought to be caused by *Trichosporon beigelii*, but after genetic analysis, *Trichosporon ovoides* is now considered to be the agent of white piedra from scalp hair, whereas *Trichosporon inkin*, *Trichosporon asahii*, and *Trichosporon mucoides* from the crural regions. Rarely, *Trichosporon* species may be accompanied by *Candida* such as *Candida albicans* is well known to cause cutaneous infections, it has been reported as a co-isolate for white piedra along with *Trichosporon*. We report a case of white piedra from a temperate region caused by *C. parapsilosis*.

### CASE REPORT

A 42-year-old female, resident of Shimla, presented with asymptomatic white knot-like entities over her scalp hair for 5 months, which were gritty and tightly adherent to hair and became prominent on wetting the hair. There was no history of hair fall or breakage. There was no definite history of tying wet hair. The patient was otherwise healthy without any systemic or dermatological complaints. There was no history of similar complaints in the family.

On examination, there were small white nodules over the hair shafts, about 1 mm in size, involving most of the hair, distributed irregularly along the hair length, and encircling the hair shaft [Figure 1]. The nodules were hard, nonbrittle, and immovable over the shaft. There was no evidence of pediculosis, seborrhea, or alopecia. The hair over the other areas of the body was normal.

Routine investigations were normal.

Direct microscopic examination of 10% potassium hydroxide wet mount showed sleeve-like concretions encircling the hair shafts with a spore-like structure, composed of hyphae and blastoconidia [Figure 2].

### ABSTRACT

White piedra is a superficial fungal infection of the hair shaft, caused by *Trichosporon*, a noncandidal yeast characterized by the presence of numerous, discrete, asymptomatic nodules attached to the infected hair shafts. White piedra is considered a disease of tropical regions and occasionally reported from temperate countries. Although *Candida parapsilosis* such as *Candida albicans* is well known to cause cutaneous infections, it has been reported as a co-isolate for white piedra along with *Trichosporon*. We report a case of white piedra from a temperate region caused by *C. parapsilosis*.

**Key words:** *Candida parapsilosis*, temperate region, white piedra
The fungal culture of the hair strands was done on two sets of Sabouraud dextrose agar (with chloramphenicol and without cycloheximide) and incubated at 37°C [Figure 3]. Moist yeast-like, cream-colored pasty colonies grew after 2–3 days of incubation in all the four tubes. Microscopic examination of the lactophenol cotton blue mounts demonstrated oval budding yeast-like cells about 3–5 µm in size. No anthroconidia were observed [Figure 4]. Species identification was done from three isolates by BD automated Phoenix system (Becton Dickinson Yeast identification Panel) using yeast panels. These were confirmed as *C. parapsilosis* in all the three tubes with 99% confidence limit.

The patient was prescribed 2% ketoconazole shampoo along with itraconazole 100 mg twice a day for 4 weeks and advised to follow after 4 weeks, but was lost to follow-up, probably because the condition was cured.

**DISCUSSION**

Superficial mycosis involving hair includes black piedra and white piedra. Black piedra generally involves scalp, whereas white piedra is more common on the hairs of the beard, mustache, and genital areas.[1] White piedra is a disease of tropical regions and occasionally reported from temperate countries.[1] Our patient was a resident of Shimla, a temperate region in North India (31.1048 N, 77.1734 E, altitude 2276 m from the sea level and temperature range – 4°C–31°C). White piedra is caused by *Trichosporon* species, which under normal circumstances is commensal in the human body, but can cause opportunistic infections such as Candida. The incidence of candidiasis has increased considerably over the past three decades, mainly due to the...
rise of the AIDS epidemic, an increasingly aged population, higher number of immunocompromised patients, and the more widespread use of indwelling medical devices.\textsuperscript{[3]} \textit{Candida albicans} is the main cause of candidiasis; however, nonalbicans \textit{Candida} species such as \textit{Candida glabrata}, \textit{Candida tropicalis}, and \textit{C. parapsilosis} are now frequently identified as human pathogens.\textsuperscript{[3]} 

Over the past decades, the incidence of \textit{C. parapsilosis} has dramatically increased.\textsuperscript{[4]} \textit{C. parapsilosis} was first isolated by Ashford. The species was named \textit{Monilia parapsilosis} to distinguish it from the more common isolate, \textit{Monilia psilosis}, better known today as \textit{C. albicans}. Although initially considered nonpathogenic, \textit{C. parapsilosis} was identified as the causative agent of a fatal case of endocarditis in an intravenous drug user in 1940.\textsuperscript{[4]}

\textit{C. parapsilosis} cells display oval, round, or cylindrical shapes. When grown on Sabouraud dextrose agar, colonies of \textit{C. parapsilosis} are white, creamy, shiny, and smooth or wrinkled.

\textit{C. parapsilosis} is one among the common major causative agent of \textit{nonalbicans} candidiasis (endocarditis, meningitis, peritonitis, onychomycosis, vulvovaginitis, and urinary tract infections).\textsuperscript{[4]}

It has also been isolated from hair and nail substrates of healthy volunteers by scanned electron microscopy under aseptic conditions (after multiple washes with sterilized distilled water, 70% ethanol, and acetone) by Oliveira \textit{et al.}\textsuperscript{[3]} Cell morphology of the two phenotypes (crepe and smooth) has been identified. Cells from the crepe phenotype are predominantly elongated, with size 1–5 \(\mu\)m, and smooth phenotype are small and yeast shaped, ranging from 0.5 to 3 \(\mu\)m in size.\textsuperscript{[3]}

\textit{C. parapsilosis} has been co-isolated from white piedra of the scalp with \textit{T. inkin},\textsuperscript{[3]} and it was thought to be an associate, as its role as a causative organism was not clear; however, in the present case, \textit{C. parapsilosis} was the only yeast isolated from multiple fungal cultures. This supports our inference of \textit{C. parapsilosis} being the sole causative agent in this case.

The American Academy of Dermatology Guidelines Committee recommends complete removal of the infected hair as the treatment of choice for white piedra.\textsuperscript{[3]} However, total shaving of the scalp hair is not socially or culturally acceptable. Various topical antifungal products including imidazoles, ciclopirox olamine, 2% selenium sulfide, 6% precipitated sulfur in petrolatum, chlorhexidine solution, Castellani’s paint, and zinc pyrithione have been used as modalities of treatment with various outcomes. However, systemic treatment is required as topical formulations are incapable of achieving significant therapeutic concentrations in the intrafollicular portions of the hair that harbor the fungus. In a study by Khandpur and Reddy, itraconazole was found to be effective in 11 patients with culture negativity at 8 weeks of therapy.\textsuperscript{[6]} The limitation of our study is that we were unable to perform repeat fungal culture after the completion of therapy as the patient was lost to follow-up.

\textit{Trichosporon} species has been identified as the causative agent in all reported cases from India; however, all cases were from tropical regions (South India and Chandigarh).\textsuperscript{[7–10]} Ours is the first case from a temperate region. A definite relationship between the yeast causing white piedra and geographic location needs to be ascertained in future studies. We suggest that \textit{C. parapsilosis} can cause white piedra independent of \textit{Trichosporon} species, especially in temperate region. Thus, this case would generate awareness among dermatologists and laboratory physicians so that growth of \textit{Candida} sp. alone may not be discarded as contaminating factor.

**Declaration of patient consent**

The authors certify that they have obtained all appropriate patient consent forms. In the form the patient(s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

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**Conflicts of interest**

There are no conflicts of interest.

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