

Article

## Surgical Wound Infection in Tinea Cruris

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### A B S T R A C T

*Changes in the immune response during pregnancy until postpartum cause an increased risk of infection during pregnancy, including skin infections. Tinea cruris is a dermatophyte infection of the inguinal folds, inner thighs, perineum and buttocks. One of the risk factors for tinea cruris is obesity. Obesity aggravates the condition, causing skin changes and conditions (inflammatory and hypertrophic-based) that are often associated with excessive fungal or bacterial growth. Obesity is a risk factor for infection in Caesarean wounds. This case study will describe a patient who experienced an infected Caesarean wound with tinea cruris*

**Keywords:** *tinea cruris, wound infection, fungi*

## I. INTRODUCTION

Surgical site infection (SSI) is one of the most common complications after cesarean section and has an incidence of 3%–15%. Identification of SSI risk factors can be divided into three categories, namely factors related to the individual, factors related to pregnancy and intrapartum, and factors related to the procedure. Individual-related risk factors include maternal age, obesity, place of residence, pregestational diabetes mellitus, history of cesarean delivery, recurrent miscarriage, and condition of the mother before surgery.<sup>1</sup>

Obesity causes skin changes and conditions (inflammatory and hypertrophic based) that are often associated with fungal or bacterial overgrowth.<sup>2</sup> Obese patients have reduced subcutaneous tissue oxygenation and require a greater fraction of inspired oxygen to achieve the same arterial oxygen tension as normal weight patients, making them susceptible to surgical wound infections.<sup>3</sup> Obesity alters the integrity of lymphoid tissue and causes dysfunctional coordination of innate and adaptive immune responses due to chemotaxis, altered immune cell differentiation and function, dysregulation of cytokine production, and cross-talk between the immune system and adipose cells.<sup>2</sup>

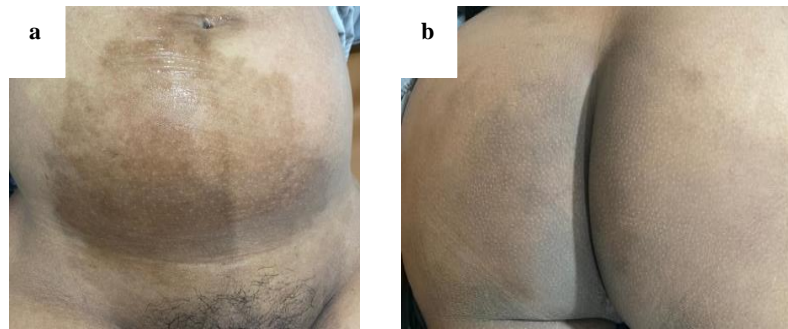
Obesity causes changes in skin physiology that predispose obese individuals to the development of various skin manifestations and diseases. One of the skin diseases caused by fungi is tinea cruris. Tinea cruris is a dermatophyte infection of the inguinal folds, inner thighs, perineum and buttocks. The prevalence of tinea cruris varies between 2.5 and 52.4%. This disease is widespread throughout the world, especially affecting teenagers and adults, including pregnant and postpartum women.<sup>4</sup>

## II. METHODS

The method used in writing this article is case study. A 33 year old patient was pregnant with her third child and never had an abortion, with a history of cesarean section twice. During pregnancy, the patient suffered from tinea cruris, which was found on the thighs, pubic groin and stomach in figure 1. The patient gave birth to her third child via cesarean section. The patient complained of pain in his stomach. The mother's general condition is good, and vital signs are within normal limits. On inspection, the wound was reddish, there was no swelling, and there was no increase in temperature in the injured tissue, as shown in Figure 2.

## III. RESULT

Skin changes occur in about 90% of pregnant women in various forms. Various skin changes can occur due to physiological (hormonal), changes in pre-existing skin diseases, or the development of specific skin diseases in new pregnancies.<sup>5</sup> Changes in the immune response during pregnancy cause an increased risk of hidden infections or new infections. This is due to high levels of estrogen, which disrupts the mother's cellular immunity. In research conducted in India, it was found that 17.2% of pregnant women were positive for infection, the majority had fungal infections at 11.2%, and 7.2% had tinea cruris.<sup>6</sup>



**Figure 1 Tinea cruris in pregnancy; a. Tinea cruris in the lower abdomen has spread downwards to involve the groin; b. Tinea cruris on the buttocks spread down to the groin**

Tinea cruris, called jock itch, is a dermatophyte infection of the inguinal folds, inner thighs, perineum and buttocks. Fungal infections occur due to fungal inoculation from dermatophyte reservoirs in the feet, hands, or nails.<sup>4</sup> *Trichophyton rubrum* is the most common species of anthropophilic dermatophyte that causes tinea cruris. Tinea cruris thrives in warm and humid conditions. A patient's history of worsening symptoms during exercise and warm weather increases the incidence of tinea cruris.<sup>7</sup>



**Figure 2 Caesarean section wound infection in tinea cruris**

The patient in this study case was obese and had tinea cruris, which worsened during pregnancy. The patient, in this case, study gave birth by cesarean section and experienced an infection in the surgical wound. Risk factors for tinea cruris include obesity, hot climate, excessive sweating, humidity, occlusive underwear.<sup>4</sup> Obese patients are susceptible to intertrigo irritation and secondary infections due to candida, tinea, or bacteria. Obesity has a higher incidence of skin infections, possibly due to changes in skin barrier function and wound healing. Sweating and maceration within the body folds cause irritation and excessive growth of microorganisms. Often, overweight patients have several skin diseases that overlap.<sup>8</sup>

#### **IV. DISCUSSION**

In obesity, adipocytes become larger, but there is no simultaneous increase in blood vessels, so the rate of angiogenesis is delayed compared to the rate of adipocyte enlargement. In addition, larger adipocytes secrete several angiogenesis inhibitors, such as angiostatin and endostatin. Increased adipocyte size is also associated with areas of hypoxia due to an insufficient number of blood vessels required to oxygenate the tissue, leading to impaired blood ventilation in the wound and a higher rate of infection in the cesarean section scar. In addition, hypoxic wounds disrupt collagen synthesis, thereby causing healing failure. The insufficient number of blood vessels is associated with delayed recruitment of immune cells in wounds, prolonged inflammatory response, and decreased secretion of mediators, micro and macro nutritional deficiencies in obese individuals also halt the healing process.<sup>2</sup>

Non-medical treatment for patients with tinea cruris includes wearing clothing that absorbs sweat, drying the body after bathing or sweating, and cleaning contaminated clothing.<sup>9</sup> The mycological cure rate is highly dependent on patient compliance. If the patient stops treatment when the lesion has improved, it is possible that remaining hyphae and spores can cause recurrence. Patients should be advised to maintain good hygiene, keeping the area dry.<sup>7</sup>

In research conducted by Yuwita, it was stated that tinea cruris is related to daily activities of heavy household work, which causes a lot of sweat and patients rarely change their clothes, besides that patients often wear clothes in layers and do not absorb sweat.<sup>10</sup> Patients with a history of bathing once a day were more likely to be found in this study (72%). This shows that there is a relationship between hygiene and fungal infections. Promotive and preventive efforts, especially personal hygiene, are needed to reduce the morbidity rate of tinea cruris in health services.<sup>11</sup>

## V. CONCLUSION

Obese patients have reduced subcutaneous tissue oxygenation and require a more significant fraction of inspired oxygen to achieve the same arterial oxygen tension as normal-weight patients, making them susceptible to surgical wound infections. Obesity has a higher incidence of skin infections, possibly due to changes in skin barrier function and wound healing. Sweating and maceration within the body folds cause irritation and excessive growth of microorganisms. Obesity causes skin changes and conditions (inflammatory and hypertrophic-based) that are often associated with excessive fungal or bacterial growth.

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