Macroconidia of Dermatophytes Fungi on Direct Microscopic Examinations

Putu Ayu Sisyawati Putriningsih*, I Putu Gede Yudhi Arjentinia

Laboratory of Internal Medicine, Faculty of Veterinary Medicine,
Udayana University. Jl. P. B. Sudirman, Denpasar-Bali Ph. (0361) 223791
*Corresponding author: putu_ayu_sisyawati@unud.ac.id

Abstract. Dermatophytosis (ringworm) caused by dermatophytes fungi is one of the cattle diseases that can infect Bali cattle. Ringworm significantly cause economic loss to farmers and at the same time is zoonotic disease. Diagnosing dermatophytosis based on the clinical signs in the animals, followed by direct microscopic examination of skin scrapings and hair samples and confirmed by laboratory tests. On direct microscopic examination of skin scrapings and hair samples, generally detected the elements of the fungi such as arthrospores or hyphae. In this study, skin scrapings and hair samples from Bali cattle that clinically suffered ringworm were collected. Samples were then placed on an object glass, added drops of 10% KOH, covered with a cover glass, and after 10-15 minutes were examined under a microscope with a magnification of 100X and 400X. We were able to detect macroconidia as well as arthrospores of the fungi. Macroconidia were detected on two of seven samples tested (28.57%). Normally, macroconidia will not be detected prior culturing on agar media and staining with Lactophenol Cotton Blue (LPCB). Dermatophytes fungi produces two types of asexual propagule: the saprophytic conidia and parasitic conidia, depending on the environment where they grow. Macroconidia that were detected in this study are saprophytic conidia possibly from the soil and/or from broken or hair loss. This macroconidia might be a potential source of infection.

Keywords: **Macroconidia, dermatophytes, direct microscopic examination, KOH**

I. INTRODUCTION

Disease caused by dermatophytes fungi frequently observed in Bali cattle. The fungi mostly infect keratinized tissue such as stratum corneal of the skin, hair and nails [1]. Animals as well as human can get the infection and it is transmitted within human and animals [2]. When dermatophytes fungi affect skin and hair of the animal it will produce white greyish circular lesion accompanied with crust, scale, hyperkeratosis and alopecia. Those lesions normally found in the face, neck, chest, leg and body of the animal [3]. Potassium hydroxide (KOH) preparation is used for the rapid detection of fungal elements in clinical specimen, as it clears the specimen so that the fungal elements more visible during direct microscopic examination.

Potassium chloride is a strong alkali, it will soften, digest and clear the tissue (keratin present in skins) surrounding the fungi so that the hyphae and conidia (spores) of fungi can be seen under microscope. Potassium chloride (KOH) mount is one of the main methods of investigating fungal infections and it is used as a primary screening tool, but may not necessarily identify the species of the fungi. To identify the fungal isolate skin scrapping and hair samples must be cultures in general fungal culture media such as Sabouroud Dextrose Agar (SDA), Dermatophytes Test Medium (DTM) or other specific fungal media based on the type of isolate anticipated [4]. Generally, the fungal elements visible under the direct microscopic examination of skin scrapping and hair are arthrospores or hyphae. However, in our study another fungal elements can be seen also using the direct microscopic examination.

II. RESEARCH METHOD

Skin scrapping and hair samples were collected from cattle which clinically had ringworm. The samples were collected from the edge area of the lesion and kept in a sterile plastic container. Sample was placed on a slide and a drop of KOH 10% was added then cover it with glass and leave for 10-15 minutes at room temperature to clear the debris so that the element of the fungi is more visible to be

observed under the microscope. Following this, sample was examined under microscope using the 10X and 40X objectives.

III. RESULTS AND ANALYSIS

White greyish circular alopecia, hyperkeratosis and hyperpigmentation are the clinical signs of the seven cattle used in this study. Majority of the lesions were in the neck area and the body of the animals (Fig. 1). Under direct microscopic examination of the skin scraping and hair samples arthrospore was detected. The arthrospore was seen as a loosely clear round shape elements. Apart from the arthrospores a boat shape with septae and several cells inside were also seen, suggesting the element is macroconidia (Fig. 2 and 3). According to Quinn et al. (2002), macroconidia under direct microscopic examination appeared spindle with numbers of cells inside [5]. From the 7 samples examined arthrospora were detected in all the samples whereas macroconidia was detected from 2 samples (28.57%) (Table 1).

TABLE 1.
NUMBERS OF ARTHROSPORE AND MACROCONIDIA OBSERVED BY DIRECT MICROSCOPIC EXAMINATION OF SKIN SCRAPING AND HAIR SAMPLES FROM RINGWORM CASES IN BALI CATTLE

Sample Code	Arthrospore	Macroconidia
1	+	-
2	+	-
3	+	-
4	+	-
5	+	-
6	+	+
7	+	+
Total	7 (100.00%)	2 (28.57%)

Fig 1. Clinical lesions of ringworm in bali cattle: white greyish circular alopecia, hyperkeratosis, and hyperpigmentation.

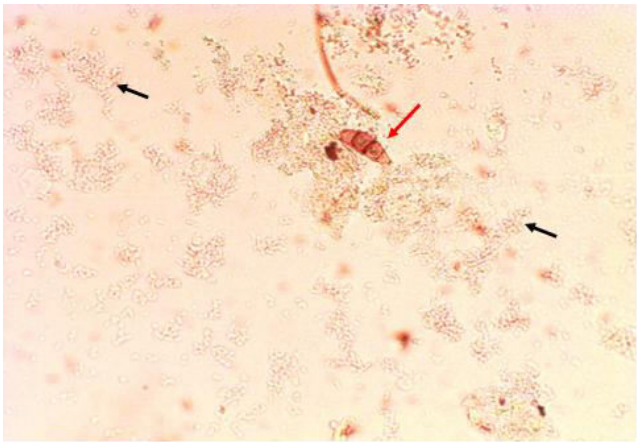

Fig 2. Direct microscopic examination of skin scraping at 40X objective showing arthrospore (black arrow) and macroconidia (red arrow)

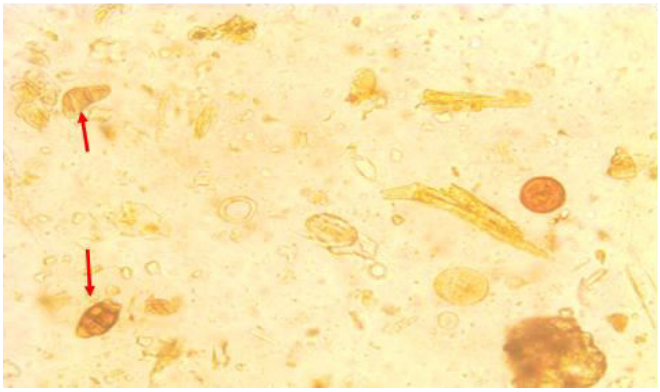

Fig 3. Direct microscopic examination of skin scraping at 40X objective showing macroconidia (red arrow).

To examine samples from ringworm cases using KOH mount under direct microscopic examination macroconidia usually is not visible. The fungi elements normally seen using this technique is arthrospore or hyphae of dermatophyte fungi. To observe other fungi elements such as macroconidia, microconidia, long septae hyphae, spiral hyphae samples need to be culture onto fungi general media. Dermatophyte fungi produces two type of asexual propagule: saprophytic and parasitic conidia depends on the surrounding growing condition. Under non-parasitic condition it will produced saprophytic conidia: macroconidia and microconidia. Whereas under parasitic condition it will produced arthrospores. Saprophytic conidia will not be produced under parasitic condition unless from broken hair or hair loss [6]. In this study macroconidia from Microsporum gypseum was observed. Microsporum gypseum is a geophylic dermatophyte and soil is the reservoir. The macroconidia is a potential source of infection especially in cattle raised traditionally. Soil is considered as non-parasitic condition, therefore the fungi produce saprophytic conidia which is macroconidia. Hair breakage and loss which is deposited on the animal skin is also considered as non-parasitic condition. This condition suggesting that zoophilic and geophylic dermatophyte can produce macroconidia from breakage and loss hair. This

result conclude that using direct microscopic examination arthrospores or hyphae as well as macroconidia can be observed.

ACKNOWLEDGMENT

The authors would like to express their appreciation to Udayana University Institute for Research and Community Service for supporting this project under Hibah Unggulan Program Studi year 2015.

REFERENCES

[1] Outerbridge, C. A.. (2006). Mycologic disorders of the skin. Clin. Tech. Small Anim Pract. 21: 128-134.

[2] Shams-Ghahfarokhi, M., Mosleh-Tehrani, F., Ranjbar-Bahadori, S.,Razzaghi-Abyaneh, M. (2009). An Epidemiological Survey On Cattle Ringworm In Major Dairy Farms of Masshad City, Eastern Iran. Iran.J. Microbiol. 1(3): 31-36.

[3] Sharma, D. K., Joshi, G., Singathia, R., Lakhotia, L. R. (2010). Fungal Infections In Cattle In A Gaushala At Jaipur. Haryana Vet. 49:62-63.

[4] Bond, R. (2010). Superficial Veterinary Mycoses. Clin. Dermato. 28: 226-236.

[5] Quinn, P. J., Markey, B. K., Carter, M. E., Donnelly, W. J. C., Leonard, F. C. (2002). Vet. Micro. Microb. Dis. United Kingdom : Blackwell Science.

[6] Cole, G. T. and Hoch, H. C. (1991). The Fungal Spore and Disease Initiation in Plants and Animals. Plenum Press. New York.