



The Effectiveness of Lugol on the Increasing of Pregnancy Rate in Aceh Cow with Endometritis

(Efektivitas larutan lugol untuk meningkatkan persentase kebuntingan pada sapi Aceh yang mengalami endometritis)

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ABSTRACT. The objective of this study was to determine the effect of lugol on the increasing the pregnancy rate in repeat breeding (RB) Aceh cows due to endometritis. This study used six endometritis's cows, aged 5-7 years, weighed 150-250 kg which were divided into two groups (n=3), KI and KII. The cows in group 1 (K1) were injected with 5 ml PGF2 α , while the cows in group 2 (KII) were treated with 50 ml of 2% lugol intra-uterine and continued with an injection of 5 ml PGF2 α after healing. The detection of estrus was performed twice a day following by artificial insemination (AI) about 10-16 hours after the onset of estrus. Determination of pregnancy was performed by ultrasonography (USG) on the 25th day after AI. The data obtained were analyzed descriptively. The results showed that all endometritis 'cows in KI and KII present estrous signs (100%). However, only one cow was recovered in K2, whereas in K1 did not. After AI, one pregnant cow was observed in KII (33.3%), while none of the pregnant cows was found in K1 (0.0%). It is concluded that the lugol treatment for endometritis's Aceh cows can improve the pregnancy rate.

Keywords: Aceh cow, endometritis, lugol, pregnancy rate

ABSTRAK. Penelitian ini bertujuan mengetahui pengaruh pemberian larutan lugol terhadap peningkatan persentase kebuntingan sapi Aceh yang mengalami RB. Dalam penelitian ini digunakan enam ekor sapi Aceh betina dewasa, umur 5-7 tahun, bobot badan 150-250 kg, sudah pernah beranak, dan didiagnosis mengalami endometritis. Seluruh sapi dibagi menjadi dua kelompok (n=3). Pada kelompok 1 (K1), sapi endometritis diterapi dengan 50 ml lugol 2% secara intra uteri dan setelah sembuh dilanjutkan dengan penyuntikan 5 ml PGF2 α . Sapi pada kelompok 2 (K2) hanya diinjeksi dengan 5 ml PGF2 α . Deteksi berahi dilakukan sebanyak dua kali per hari dan inseminasi buatan (IB) dilakukan sekitar 10-16 jam setelah awal berahi. Pemeriksaan kebuntingan dilakukan dengan ultrasonografi (USG) pada hari ke-25 setelah IB. Data dianalisis secara deskriptif. Dari masing-masing kelompok, hanya satu ekor sapi pada K2 yang dinyatakan sembuh yaitu sapi pada kelompok kedua. Persentase sapi yang menjadi estrus pada kedua kelompok masing-masing adalah 100%. Dari tiga ekor sapi yang diinseminasi pada masing-masing kelompok, hanya satu ekor sapi pada K2 (33,3%) yang menunjukkan hasil positif bunting sedangkan pada K1 tidak terdapat sapi yang menunjukkan hasil positif (0,0%). Disimpulkan bahwa pemberian larutan lugol pada sapi Aceh yang mengalami endometritis dapat meningkatkan persentase kebuntingan sapi Aceh.

Kata kunci: Sapi Aceh, endometritis, lugol, pregnancy rate

INTRODUCTION

Various efforts have been adopted to increase cattle population, including the elevation of gene quality and reproductive efficiency using artificial insemination (AI) technology (Priyanto, 2011; Susilawati, 2013). However, the high occurrence of repeat breeding (RB) becomes a major constraint in cattle population improvement. Repeat breeding is defined as the cow with normal estrus cycle but fail to conceive after at least three

times mating with the fertile bull, despite the absence of clinical symptoms indicative of reproductive diseases or abnormalities (Juliana *et al.*, 2015). The possible influencing factors include maintenance management failure (31.70%), hormonal disorders (18.03%), reproductive infections (14.75%) (Singh *et al.*, 2010), and decreased organs function in the cows due to early embryonic loss (39.10%) (Gebrekidan *et al.*, 2009).

Uterine infection is one of the causes of failure in reproduction. A study by Ahmed and Elsheikh (2014) showed the presence of bacteria infection in the uterus of all repeat breeding cows (100%). This causes subclinical endometritis, which consequently results in fertilization or

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implantation failure. Thasmi *et al.* (2018) reported the changes in anatomy pathology and histopathology of repeat breeding Aceh cows with endometritis caused by subacute and chronic infections. Various therapies have been applied for repeat breeding cows due to endometritis, including the use of antibiotics and prostaglandins (Drillich, 2006; Hussain *et al.*, 2013; Ahmed and Elsheikh, 2014; Mido *et al.*, 2016; and Szenci, 2016). Recently, lugol has been the main focus for RB and anestrus treatments (Ahmed and Elsheikh, 2014; Ahlawat *et al.*, 2016), due to its ability to overcome the infertility cases effectively as well as cost-effective (Sarkar, 2006; Ahlawat *et al.*, 2016).

Ahmed and Elsheikh (2014) reported that the repeat breeding cows caused by subclinical endometritis could be treated intrauterine with infusion of 1% iodine lugol. The treated cows showed the significant improvement of service per conception compared to the untreated cows (1.1 ± 0.1 vs. 4.5 ± 0.2). The application of this therapy on buffalo showed an increase on the pregnancy rate from 33.3% to 85.71% (Ahlawat *et al.*, 2016). It was assumed that lugol acts as a potential bactericide which can improve the uterine environment. The improvement of the uterus environment increases the tendency for ovaries to release good quality oocytes and enhances the ability to produce more uterine milk which was required in embryo implantation (Oakley, 1992 cited in Ahmed and Elsheikh, 2014). Iodine lugol is known to possess broad bactericidal activity, implicated in the enhanced healing of endometrium to restore activity (Sarkar, 2006), and consequently elevating the percentage of pregnancy.

Aceh cattle has been established as one of the national cattle in 2011, based on the Decree of Minister of Agriculture of the Republic of Indonesia Number 2907/Kpts/OT.140/6/2011. The prevalence of RB in Aceh cows has been previously reported has been reported in Pidie District is higher and achieved 58.3% (Subagyo, 2016). However, the study regarding the effect of lugol therapy on the increasing of the pregnancy rate in Aceh cows with endometritis is not available. Hence, there is a need to investigate the effect of lugol for improving the pregnancy rate in endometritis's an Aceh cows.

MATERIALS AND METHODS

Experimental Animals

This study used 6 Aceh cows which were obtained from UPT (*Unit Pelaksana Teknis*) of Experimental Animals, Faculty of Veterinary Medicine, Universitas Syiah Kuala, Banda Aceh. The cows aged 5-7 years old with liveweight ranged from 150-250 kg. The cows were mated previously and diagnosed with endometritis.

Determination of Endometritis Cows

Aceh cows were diagnosed with endometritis using Metricheck. The observation was made based on the score of uterine mucus as follows; 0 = no mucus, 1 = clear mucus, 2 = mucopurulent, 3 = mucus containing less than 50% purulent material, 4 = mucus containing more than 50% purulent material 5 = smelling mucus. Score of 0-1 are declared normal or negative for endometritis, while 2-5 were declared abnormal or positive for endometritis (McDougall *et al.*, 2007). Six endometritis cows were then divided into two treatment groups consisting of 3 endometritis's cows each group. The cows in group 1 (K1) were injected with 5 mL of PGF2 α (LutalyseTM). The cows in-group 2 (KII) were treated with 50 ml of lugol 2% intra-uterine. This was followed by the daily observation of the healing process using transrectal ultrasound (USG, Shenzhen Mindray Bio-Medical Electronics Co., Ltd.), based on the measurements of uterus diameter, endometrium thickness, as well as the presence of pus and mucus. The examination was conducted twice, before and after a 24-day therapy. The cows were considered recovered if the uterus diameter decreased; endometrium thickness is stagnant with the absence of pus and mucus. At the end of the 24th day, all the cows were injected with 5 ml of PGF2 α (LutalyseTM).

Estrus Determination and Artificial Insemination

Estrus detection was performed twice a day, in the morning (08:00 a.m) and in the afternoon (04:00 p.m) for 30 minutes based on estrus physical signs. The physical signs that indicate estrus for cows include the swollen and reddened vulva, restlessness, loss of appetite, mounting activity, and the presence of cervix mucus discharge. The artificial insemination was carried out about 10-16 hours after the estrus was confirmed.

Determination of Pregnancy

Determination of pregnancy was performed using an ultrasound at 25 days post artificial insemination. The positive result was confirmed by the presence of anechoic fluid in one of the uterine horns (Caudhary and Purohit, 2012). The data were presented as the pregnancy rate of Aceh cows after treated with lugol and analyzed the descriptively.

RESULTS AND DISCUSSION

Cervical mucus scoring in endometritis cows from both groups before treatment showed score ranged 2-5. After treatment, one of endometritis cows in group K2 (treated with lugol) was recover, while none of the endometritis cows in group K1 (without lugol treatment) was recover (Table 1). This result was lower (33.3%) compared to the previous study reported by Kumar (2010) in which the percentage of recovery rate of endometritis's cows was 62.5% following lugol treatment.

In this study, the recovery from endometritis was confirmed by the presence of clear mucus with score 0-1. Bhardwaz *et al.* (2018) reported the ability of lugol intra-uterine infusion to produce clear mucus discharge in 60% endometritis cows as compared to 10% in endometritis cows without lugol treatment. The clear mucus as an indicator of recovery from endometritis in this study was assumed due to the decrease of bacteria after lugol treatment. Kumar (2010) reported that the number of bacteria was declined after lugol treatment and it was indicated by the presence of clear mucus discharge. Bhardwaz *et al.* (2018) also reported the decrease in the bacteria number in mucus discharge of endometritis cows before and after flushing with lugol solution from 323.88 ± 2.15 ($\times 10^4/\text{mL}$) to 1.39 ± 0.00 ($\times 10^4/\text{mL}$), respectively. In addition, the lugol solution has also been proven capable of increasing polymorphonuclear leukocytes (PMNLs) in endometritis RB cows as reported by Singh *et al.* (2010), which contribute in phagocyte the bacteria.

Table 1. Percentage of pregnancy in Aceh cows with endometritis after receiving lugol therapy

Parameters	Treatment	
	PGF2 α	PGF2 α + lugol
Number of healing cows (%)	0 (0)	1 (33,3)
Number of estrous cows/AI (%)	3 (100,0)	3 (100,0)
Number of pregnant cows (%)	0 (0)	1 (33,3)

The percentage of estrus cows in each group was 100%, which was higher than the previous finding by Sarkar (2006), where 60% estrus cows were reported 5-10 days after the anestrus cows were treated with lugol. This probably due to the cows used in this study were the repeat breeding cows with endometritis. The repeat breeding of Aceh cow showed the estrus cycle regularly which is attributed to the higher percentage of estrus cows in n this study. Moreover, Ahlawat *et al.* (2016) also reported the lower percentage of estrus cow compared to the results of the current investigation, where 70% and 30% were recorded in the treatment and control groups, respectively. These variation results might be due to a disparity in the types of livestock used. Ahlawat *et al.* (2016) used Jaffrabadi buffalo and generally buffalo is considered as livestock with silent heat. Therefore, the effect of lugol administration could not observed properly. After the artificial insemination process, the pregnancy rate of 33,3 % (1 out of 3 cows) was found in K2 group which was treated with lugol, while none of the cows

were pregnant in K1 group. This result was in line with the previous report which documented the pregnancy rate of 30.0 % in repeat breeding cow after intra-uterine administration of 0.3% lugol (Bhardwaz *et al.*, 2018). However, Pandey *et al.* (2011) reported higher pregnancy rate in dairy cows at first insemination on day 5 (68.75%) and 17 (71.43%) of the estrus cycle, after treated with 20 ml of 0.25% lugol.

The determination of pregnancy was based on the presence of embryonic vesicles, which shows an isoechoic/anechoic to hyperechoic coloration on a sonographic display, surrounding hypoechoic fluid originated from the embryonic (Sayuti *et al.*, 2016). The embryonic vesicles observed in this study are shown in Figure 1.

Generally, the administration of lugol improves the pregnancy rate of cows, based on the report of Pandey *et al.* (2011), Bhardwaz *et al.* (2018), Ahlawat *et al.* (2016), Singh *et al.* (2010), Sarkar (2006), Ahmed and Elsheikh (2013), and Alyasiri *et al.* (2015). Singh *et al.* (1987) and Sane *et al.* (1982) stated that the positive response of the lugol solution on the improvement of

reproduction performance due to its effect on the uterus and ovaries. Lugol may irritate and increase blood circulation in the uterus and ovaries which increase the iodine absorption from the uterus. The increase of iodine absorption improves metabolic rate through stimulation of thyroid hormone secretion, maintains homeostasis of Ca and P, increases the body weight, and regulates the estrus onset

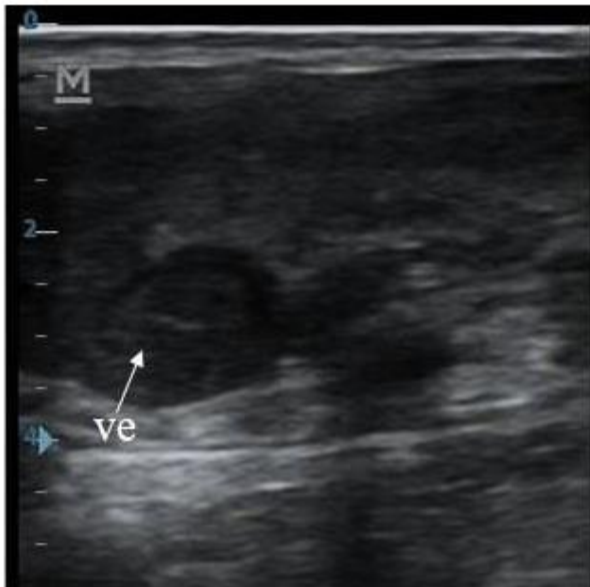


Figure 1. The uterus sonographic display of pregnant Aceh cow on day 25 post insemination (ve= vesicular embryonic).

CONCLUSION

It is concluded that the lugol treatment to endometritis's Aceh cows with endometritis can improve the pregnancy rate.

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