

## DIAGNOSIS OF DIFFERENT MAMMARY GLAND AFFECTIONS IN GIR COWS BY ULTRASONOGRAPHY

Patel NP<sup>1</sup>, Talekar SH<sup>1\*</sup>, Visnudeo Kumar<sup>2</sup>, Bhatt RH<sup>3</sup>, Trangadia BJ<sup>3</sup>, Dodia VD<sup>4</sup> and  
Padaliya NR<sup>4</sup>

<sup>2,3</sup>Associate Professor and Head, <sup>4</sup>Assistant Professor, <sup>1</sup>PG Scholars  
College of Veterinary Science and Animal Husbandry, Kamdhenu University,  
Junagadh-362001, Gujarat, India

E-mail: shivaji.talekar@gmail.com (\*Corresponding author)

**Abstract:** The present study entitled “Ultrasonographic studies of mammary gland affections in Gir cows” was conducted to establish technique of ultrasonography for diagnosis of mammary gland affections in Gir cows. The present clinical study was conducted on 100 Gir cows presented to Department of Veterinary Surgery and Radiology, COVSAH, KU, Junagadh during study period. In present clinical work mammary gland affections i.e., involvement of single teat affections were highest (46.51%), followed by double teat (25.58%), four teat (18.60%) and triple teat (6.97%). Teat obstruction contributed for the highest number of cases (42) followed by mastitis (33), udder fibrosis (15), udder abscess (06), and teat fistula (04). In Gir cows, the majority of milk flow problems occurred between the ages of 3-6 years followed by 6 years and above. The present study revealed that the average number of lactation or parity of the bovines were 2.94±0.23. In Gir cow, milk flow disorders were most common during the second parity, followed by third parity. The average milk yield of the different groups studied was 12.50±1.72 Kg. The highest milk yield was recorded in group II (teat fistula) was 21.15±2.85 Kg. In group V (udder fibrosis) milk yield was nil and group Id (complete teat obstruction) had the lowest milk yield of 2.06±1.20 Kg. The mean value of hemoglobin of all the groups was 9.36±0.11 gm/dl. The mean value of Total Leukocyte Count was 8481.53±58.53. The highest Total Leukocyte Count were found in group If (mastitis) 12240.05±279.87, group Id (complete teat fibrosis) 9595.53±65.30 and group VII (udder fibrosis) 9570.03±322.00 respectively. The average mean value of differential leukocyte count was reported as follows: Neutrophils - 37.39±4.87%; Lymphocytes - 61.49±4.84%; Eosinophils - 0.07±0.05%; and Basophiles - 0%. In the present study, the average mean value of heart rate, respiration rate and rectal temperature was recorded as 62.70±1.78 per minute, 41.27±1.86 per minute and 101.46±0.11 °F respectively. In present clinical study, ultrasonography for diagnosis of mammary gland affections and their differential diagnosis in Gir cows is found easy, quick and low cost technique.

**Keywords:** Gir cow, Ultrasonography, Udder.

### Introduction

Ultrasonography (USG) is a technique for detecting morphological anomalies in the mammary gland's canals, sinuses, and glandular tissue (Twardon *et al.*, 2001). Obstructions of the teat and udder cistern, both congenital and acquired, are typical causes of milk flow problems in

cattle (Dinc *et al.*, 2000). Inflammation, mucosal lesions, tissue expansion, foreign bodies, milk stones, congenital changes, hematoma, and abscess are all abnormal udder changes that can be diagnosed with USG. In cattle, linear-array transducers with frequency ranges of 5.0 MHz, 7.5 MHz, and 10 MHz are most widely used to perform ultrasound examinations (Szencziová and Strapak, 2012).

### **Materials and Methods**

The current research “Ultrasonographic studies of mammary gland affections in Gir cows” was conducted on 100 Gir cows of various age groups at the department of veterinary surgery and radiology, College of Veterinary Science and Animal Husbandry, Kamdhenu University, Junagadh during year 2021.

### **Ultrasonography of udder and teat**

Complete history pertaining to age, post calving period and average milk production was recorded in the evolved Performa prior to the ultrasonography in all animals. A detailed examination of udder and teat was performed in all animals using ultrasonography. The surface of the linear transducer with coupling gel was mounted directly on the skin surface of the teat and udder in the contact gel technique. In water bath technique, the teat was embedded in a small plastic jar (decapped disposable usual saline plastic bottle) or container filled with water, and the probe with the gel was applied to the container's external surface. The contact gel application with a 3.5 or 5 MHz frequency probe by direct contact of the probe on the udder skin was the primary method of ultrasound analysis of the mammary gland parenchyma in animals. The probe was mounted on the caudal surface of each half along its longitudinal axis and rotated upward and downward to scan the entire udder (Flock and Winter, 2006). The probe was positioned with an 80° scanning angle cranially just above the teat insertion to examine the gland cistern (Ayadi *et al.*, 2003). The probe was mounted on the dorsal and lateral to the caudal aspect of the udder halves to examine supramammary lymph nodes (Hussein *et al.*, 2015).

Using a two-dimensional, grey scales, B-mode Ultrasonography device, bovine teats were scanned ultrasonographically. Various systems of common and affected bovine teats were photographed in the United States. The normal and abnormal echogenicity of the various structures were determined using sonography. The teat's ultrasonographic appearance was reported and compared to its usual appearance using two-dimensional grey scale B-mode ultrasound at different frequencies (3.5-5 MHz). Teats of bovines suffering from affections were also scanned to investigate the anomaly. The teat wall thickness, streak canal length, teat

canal length and whole teat diameter were measured both in normal and affected teats by using ultrasound calipers.

### **Result and Discussion**

In present study, ultrasound was performed on all 100 Gir cows, and the most affected age group suffering from mammary gland pathologies was between 3 and 6 years of age 51 (51%) accompanied by 6 and above years of age 37 (37%) and 0-3 years of age 12 (12%).

Present study indicate that most affected parity group of Gir cows suffering from mammary gland affections was between 0 and 2 parity 41 (41%) accompanied by 2 and 4 parity 28 (28%), 4 and 6 25 (25%) and 6 and 8 parity 06 (06%).

The average milk yield of the different cow groups studied was  $12.50 \pm 1.72$  (Kgs). As shown in Table No. 4.6 and Fig. No. 4.3. The highest milk yield was recorded in group Ie teat fistula ( $21.15 \pm 2.85$  Kgs). This means that animals with high milk yields are more susceptible to milk flow problems like teat fistula and leaky teats. This may be due to the udder's large and pendulous scale in high-yielding animals. However, according to Kadu and Gahlod (2013), there is no connection between milk yield and the incidence of milk flow disorders. Group V udder fibrosis ( $0.00 \pm 0.00$  Kgs) and group Id complete teat obstruction ( $2.06 \pm 1.20$  Kgs) had the lowest milk yields. The milk yield in group V was zero due to complete udder fibrosis. Since one or more teats is totally obstructed in groups Ia obstruction at the tip of the teat, Ib obstruction in the center of the teat and Ic obstruction at the base of the teat, milk yield was comparatively low.

The average mean of teat canal diameter was  $1.53 \pm 0.02$  cm in affected teats and  $2.07 \pm 0.02$  cm in normal teats in the current study. The TCD was assessed in 16 affected teats  $1.09 \pm 0.03$  cm in group Ia obstruction at the teat tip (n=14) and found to be lower than those of the normal teat ( $2.12 \pm 0.03$  cm). This decrease in teat canal diameter could be due to milk stagnation in obstructed teats, which could have caused teat canal distension.

In the present analysis, the average teat wall thickness was reported to be  $0.66 \pm 0.03$  cm in affected teats and  $0.56 \pm 0.03$  cm in normal contra lateral teats. In contrast, higher values were recorded by Thomas *et al.* (2004), Klein *et al.* (2005) Flock and Winter (2006) and Raj *et al.* (2010) ranging around 2.40 cm in normal teats of bovine. This could be due to variation in breed, size and lactation status of the animal.

In 42 cases of teat obstruction ultrasonographic examination appeared as hypo-echoic structures with anechoic lumens. Teat wall showed three distinct layers: a hyper-echoic outer layer, a thicker

hypo-echoic middle layer and a hyper-echoic inner layer. Teat canal appeared as an echogenic areas along with hyper echoic band like structure present at the middle of the image. The rosette of Furstenberg appeared as hyper echoic circular area in the center of the teat (Fig.1).

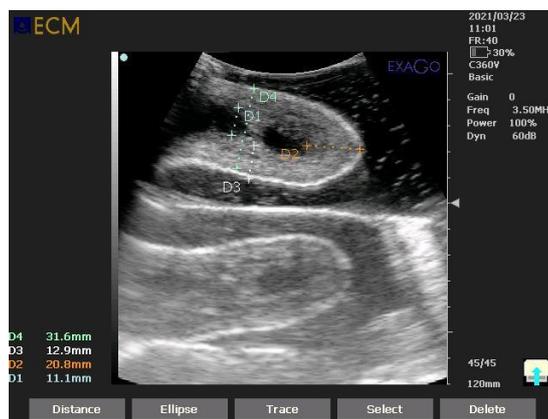


Fig.1 Ultrasonographic image of teat obstruction.

In 4 cases of teat fistula teat wall showed break in all three distinct layers: a hyper-echoic outer layer, a thicker hypo-echoic middle layer and a hyper-echoic inner layer. Teat canal appeared as an echogenic areas along with some hypo echoic areas (Fig.2).



Fig.2 Ultrasonographic image of teat fistula

In 33 cases of mastitis ultrasonographic image of udder appeared as homogenous hypo echoic with lack of clarity of visualization of milk alveoli and lactiferous duct. There is loss of an echogenicity of gland cisterns and appeared as mixed hypo echogenic content (Fig.3).



Fig.3 Ultrasonographic image of udder which show mastitis



Fig.4 Ultrasonographic image of udder abscess

In 6 cases of udder abscess Ultrasonographic image appeared as appeared as hypo echoic space occupying images within the homogenous hyper echoic udder parenchyma (Fig.5).

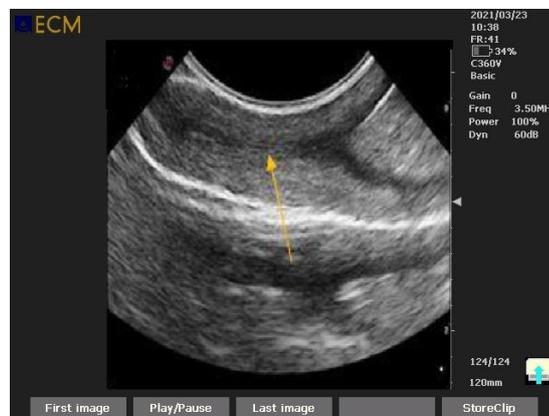


Fig.5 Ultrasonographic image of udder fibrosis

In 15 cases of udder fibrosis ultrasonographic image of udder is hyper echoic appearance and loss of typical echo pattern of the udder (Fig.5).

## **Conclusion**

In present clinical study cases of mastitis and fibrosis, Ultrasonography provides useful information regarding the structural changes of the udder and teat tissue.

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