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CLINICAL AND SURGICAL ASPECTS OF CERTAIN CONGENITAL ANOMALIES IN CATTLE AND BUFFALOES

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SUMMARY

Among 1860 examined cattle and buffaloes calves, 84 calves had congenital anomalies representing 4.5%. The incidences among the examined Friesian (800), Balady (260) and buffaloes calves (800) were 3.5%, 3.1% and 6.0% respectively. Among twelve patterns of diagnosed congenital anomalies, heterochromia iridis, umbilical hernia and atresia ani were the predominant ones. Compared with other body regions, anomalies of the head and abdominal wall were the most common ones. Although surgical management was successful in certain congenital anomalies, culling of the affected calves was of economic importance.

INTRODUCTION

Abnormal and/or arrests in the fetal development leads to either its death or malformation. Anomaly is a malformation involves one organ or a part of the animalís body. The presence of extensive deformities is known as a monster. Regarding etiopathogenesis; genetic, toxic, infectious, nutritional and inheritance were suggested as probable causes of congenital anomalies in ruminants. Regardless the probable causes of congenital anomalies, financial losses in bovine economics are considerable and documented (Amstutz, 1978; Ojo, et al., 1981; Roberts, 1986;Blowey and Weaver, 1991 and Radostits, et al., 2000).

Many literature concerning congenital anomalies in cattle and buffaloes have been reported (Huston and Wearden, 1958; Leipold, et al, 1973&1974; Binns, et al., 1972; Greene, et al., 1973; Singh, et al., 1982; Misk, et al., 1983 &1985; Nigam, et al., 1984; Tantawy, 1984; Brem, et al., 1985; Rifat, 1985; Abdel-Hamid, et al., 1987; Deeb, 1987; Othman and El-Maghraby, 1987; Soliman and EL-Shair, 1987; Soliman, et al., 1987; Van-Huffel and Demoor, 1987; El-Maghraby, 1988; Ibrahim, 1988; Kenawy 1988 &

1991; Misk and Hifny, 1988; Shawki, 1990; Abd-Elbaset, et al., 1992; Kandeel et al., 1992; Kenawy and Kassem, 1992; Khamis, et al., 1992; Ragab, 1993; Senna, 1994; Misk et al., 1998; Moritomo et al., 1999 and Abu-Seida, 2002).

The reported incidences of congenital anomalies in cattle and buffaloes are different according to localities. However, most of congenital anomalies are evident on external clinical examination; many patterns are not reported unless several cases ocurred (Dennis, et al., 1975; Amstutz, 1978; Ojo, et al., 1981; Roberts, 1986; Blowey and Weaver, 1991 and Radostits, et al., 2000). The aim of the present study is to describe the clinical and surgical aspects of some congenital anomalies and to put on record some rare defects in cattle and buffaloes especially those of young age.

MATERIAL AND METHODS

During the period between November, 2002 to April, 2004, 800 Friesian, 260 Balady and 800 buffaloes calves were examined in four private cattle and buffalo farms at EL-Kaliobia and Fayoum provinces (2 farms in each) and at Surgery Clinic, Fac. of Vet. Med., Cairo Univ. Giza. The examined calves were of both sexes and their age ranged between one day and one year (Table 1).

Diagnosis of the congenital anomalies was based upon anamnesis, clinical, radiological and ultrasonographic findings. Congenital anomalies were tabulated according to topographic anatomical regions (head, neck, thorax, abdomen, pelvis, perineum and skeleton).

The used anaesthetic regimen for surgical interferences included IM Xylazine Hcl (Rompun; Bayer), when needed, at a dose of 0.1 mg/kg b.wt. associated with local infiltration analgesia using Lidocaine Hcl 2% solution (Xylocaine; Astra Sodertalje). Surgical management of the operated cases was performed according to the techniques described by Oehme and Prier (1976); Aanes (1980) and Jennings (1984). Cases with large umbilical hernial defects were treated by prosthetic herniorrahphy using commercial polyester fabric (C.P.F.) (Shokry et al., 1997).

RESULTS

Congenital defects in cattle and buffaloes represented 4.5% of the total examined animals. The incidence among the examined Friesian calves (800), Balady calves (260) and buffalo calves (800) was 3.5%, 3.1% and 6.0% respectively. Affected males represented 4.5% of the total examined males (1120) and affected females were 4.6% of the total examined females (740) (Table 1). Table 2 shows the incidence of the diagnosed congenital anomalies in different body regions. Congenital anomalies of the head and neck represented 51.2% of the total diagnosed anomalies (43/84) followed by those of the abdominal wall (27/84; 32.1%).

Among 12 diagnosed patterns of congenital anomalies (Table 3), heterochromia iridis, umbilical hernia and atresia ani represented the most common patterns (47.6%, 30.9% and 5.9% respectively). The age of 90% of the affected calves were less than four months and none of them showed more than one congenital anomaly.

Table 1: Number, breed and sex of the examined and affected calves.

Animals	Breed			Sex		Total
	Freisian	Balady	Buffaloes	Males	Females	
Examined calves	800	260	800	1120	740	1860
Affected calves	28	8	48	50	34	84
%	3.5%	3.1%	6.0%	4.5%	4.6%	4.5%

Table 2: Congenital anomalies in relation to different body regions of the affected calves.

Regions	Friesian	Balady	Buffaloes	Total (%)
Head & neck	2	1	40	43 (51.2%)
Thorax & abdomen	19	1	7	27 (32.1%)
Pelvis & perineum	5	3	-	8 (9.5%)
Skeletal system	2	3	1	6 (7.2%)
Total	28 (33.3%)	8 (9.5%)	48 (57.1%)	84 (100%)

Table 3: The recorded congenital anomalies of the affected calves.

Congenital anomalies	Breed			Sex		Total %
	Freisian	Balady	Buffaloes	Males	Females	
Heterochromia iridis	-	-	40	31	9	40 (47.6%)
Bilateral anophthalmia	-	1	-	1	-	1 (1.2)
Bilateral cheilognathoschisis	1	-	-	1	-	1 (1.2)
Palatoschisis	1	-	-	-	1	1 (1.2)
Umbilical hernia	19	1	6	9	17	26 (30.9%)
Epitheliogenesis imperfecta	-	-	1	-	1	1 (1.2%)
Atresia ani	3	2	-	5	-	5 (5.9%)
Atresia ani & Rectovaginal F.	2	1	-	-	3	3 (3.6%)
Angular limb deformities	1	-	1	1	1	2 (2.4%)
Tailessness	1	1	-	1	1	2 (2.4%)
Polymelia	-	1	-	1	-	1 (1.2%)
Bilateral patellar ectopia	-	1	-	-	1	1 (1.2%)
Total	28 (33.3%)	8 (9.5%)	48 (5.1%)	50 (59.5%)	34 (40.5%)	84 (100%)

Congenital anomalies of the head and neck

Heterochromia iridis (40 cases)

Forty buffalo-calves (31 males and nine females) represented 5% of the total examined buffalo calves were affected. Heterochromia iridis was unilateral in 10 cases (six in right eye and four in left one) (Fig. 1a) and bilateral in 30 cases (Fig. 1b). The heterochromic iris was hypoplastic in 15 cases and had white, light blue, brown and /or grey colour.

Bilateral anophthalmia (one case)

A one-week-old male balady calf suffered bilateral anophthalmia. The eyelids were normally developed. Both eyes were atrophied and only vestiges of occular tissues were present (Fig. 2). This calf was completly blind and it was fed by artificial suckling. No other congenital defects were detected in this calf.

Bilateral cheilognathoschisis (bilateral cleft lips; harelips) (one case)

A three-month-old male Friesian calf was affected with bilateral cleft lips. There were bilateral deep grooves extending obliquely across the skin of upper lip, nasolabial palate and a part of the body of incisive bones (premaxilla) (Fig. 3). This calf showed difficulty in sucking milk either from its dam or through bucket feeding (unable to share other calves in feeding milk) and a considerable amount of milk was lost. The calf was prepared for slaughter by fattening.

Palatoschisis (one case)

During sucking from dam, the milk escaped from the nostril of a 2-day-old female Friesian calf which was emaciated, dehydrated and in a weak condition. Oral examination showed a congenital fissure (split) in the hard plate (Fig. 4). Two days later, the calf died due to aspiration pneumonia. On necropsy, the buccal cavity was connected to the nasal one through a fissure (10 cm length x 5 cm. width). The lungs were congested and showed patches of hepatization, the heart was slightly hypertrophied and the liver and intestine were normal. No other congenital defects were detected.

Congenital anomalies of thorax and abdomen

Umbilical hernias (26 cases)

Umbilical hernias represented 1.4% of the total examined calves (1860) and 30.95% % of the total defected cases (Table 3). All affected calves were under five months old. Friesian calves were at high risk (19 cases) and female calves were more affected (17 cases) than males (nine cases). The hernia appeared as circumscribed / or oval painless compressible swelling at the umbilicus. All cases were reducible except one case, which was voluminous. The size of the hernias ranged between lemon size to large watermelon size. The hernial rings ranged between one finger to hand-breadth in diameter. Ultrasonographically, the size of hernial rings and the hernial contents were scanned in 12 cases. The hernial ring appeared as a defect in the abdominal wall surrounded by

hyperechoic collar. The layers of abdominal wall lost its normal echogenic appearance. The herniated contents were omentum and/or intestine. Herniorrahphy was carried out and recovery was uneventful in all operated cases (Fig. 5 & 6).

Epitheliogenesis imperfecta with visceral eventration at umbilicus (one case)

A two-day-old female buffalo calf was born with a portion of small intestine prolapsed at the umbilical region. The colour of the exposed intestinal loops was deep red. This calf showed general weakness and had a slit-like opening (3x5 cm) devoid of skin at the umbilical region (Fig. 7). The prolapsed intestine was surgically reduced without complications.

Congenital anomalies of pelvis and perineum

Atresia ani (5 cases)

Atresia ani represented 5.9% of the total congenital defects (Table 3) The five male affected calves were three Friesian and two Balady ranged in age between 3-15 days. Abdominal distension, frequent straining and tenesmus since birth were the common signs. No faeces voided out from the defective animals. On clinical examination, there was an absence of the anal opening. The skin at this site was bulged on abdominal pressure. Surgical creation of an anal opening corrected the conditions.

Atresia ani and rectovaginal fistula (3 cases)

This anomaly was diagnosed in two Friesian and one Balady calves represented 3.6% of the total defected animals. The affected calves ranged in age between 1-3 months and showed frequent straining and tenesmus during defecation. On clinical examination, the anal opening was absent and the faeces/urine came from vulva through the vagina. A fistulous tracts (1-3 fingers diameter) were palpated on varying distances (5-10 cm.) from the vulvar opening. Surgical reconstruction of the perineal area was performed and gave good results in all operated cases (Fig. 8).

Skeletal anomalies

Angular limb deformities (2 cases)

Carpal vulgaris was diagnosed in 45-day-old female bufalo calf. Both carpi were tied - in while the distal limbs were tied-out (Fig. 9). This defective calf showed a detectable degree of lameness during motion.

A 3-month-old male Friesian calf was affected with bilateral straightness (wide angle) of the hock joints. Incoordination was evident on progression (Fig. 10). Culling of both affected claves was carried out.

Taillessness (2 cases)

Two calves (2-month-old female Friesian and 3 month-old male Balady calf) were affected with taillessness. The tail and all coccygeal vertebrae were absent and the perineal area was exposed. There were a concave rump and a relatively anterior and dorsal misplacement of vulva and anus (Fig. 11).

Polymelia (one case)

A 5-month-old male native calf had two extra-limbs (polymelia) present at the withers (thoracomelia) (Fig. 12). There was history of unaided parturition. These extra-limbs were movable, attached only to the skin and subcutaneous tissues. Examination revealed skin sensation over the length of extra-limbs, two joints similar to both carpi, two cannon bones, phalangeal bones and its articulations. The parts of cranial extra-limb were apparantly normal in its development. The caudal one was reatively smaller had angular fetlock and claws deformities (Fig. 12). Both extra-limbs were successfuly excised.

Bilateral patellar ectopia (one case)

A one-week-old female balady calf was unable to stand on both hind limbs since birth. It showed squatting position when tried to stand. The calf had bilateral excessive flexion of both stifle and hock joints. On palpation, femoral condyles and tibial tuberosities were apparently normal however, both patellae were laterally displaced. Radiographic examination revealed bilateral patellar luxation (Fig. 13). Fattening and culling of the affected calf was performed.

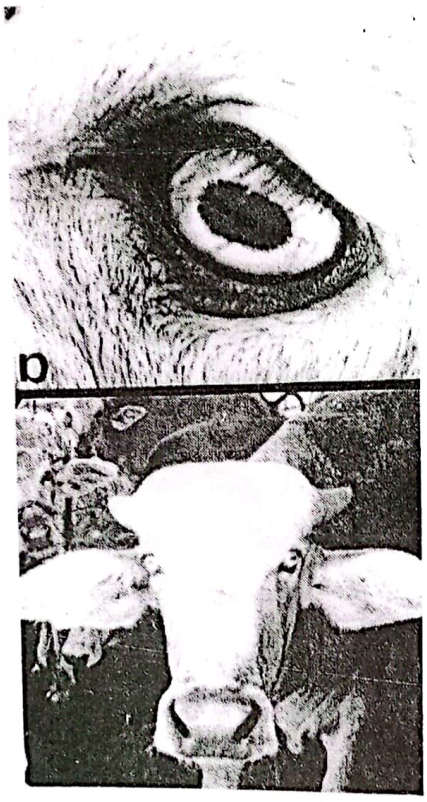

Fig.1: Heterochromia iridis; unilateral (a) and bilateral (b). Note, the ciliary zone is white and the pupillary zone is bluish.

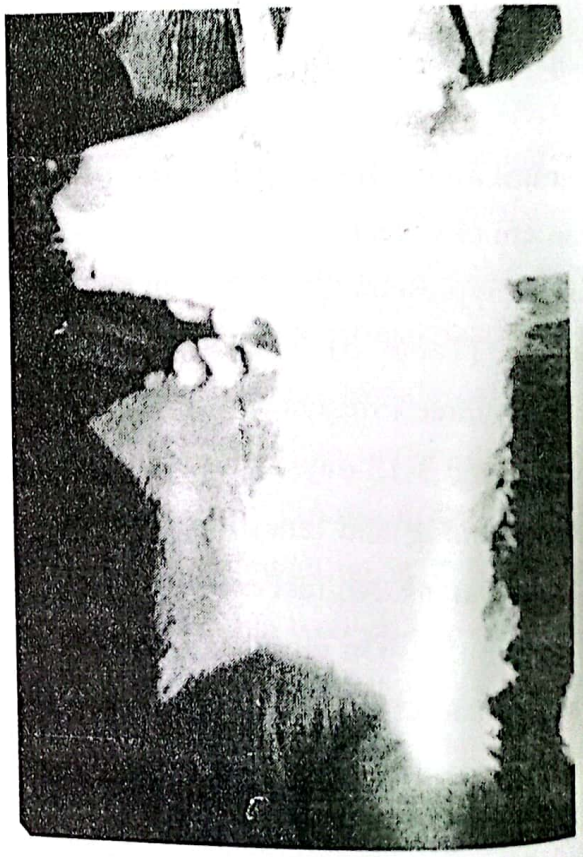

Fig.2: Bilateral anophthalmia in on week-old male balady calf. Note the presence of vestiges of occular tissues.

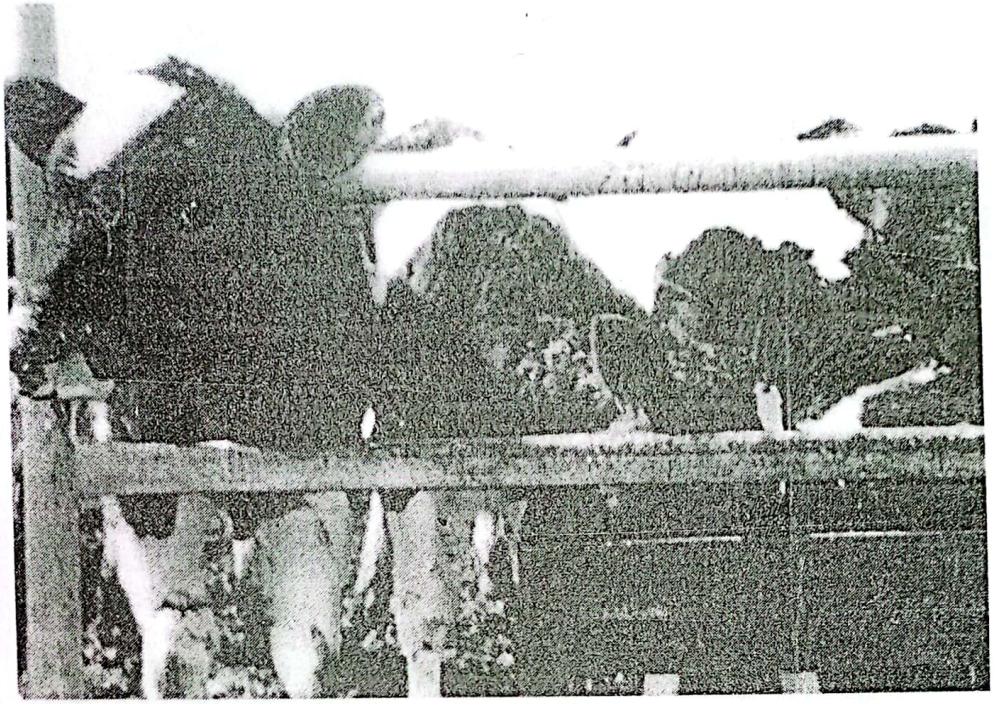

Fig.3: Bilateral cheilognathoschisis (harelips) in 3-month-old male Friesian calf.

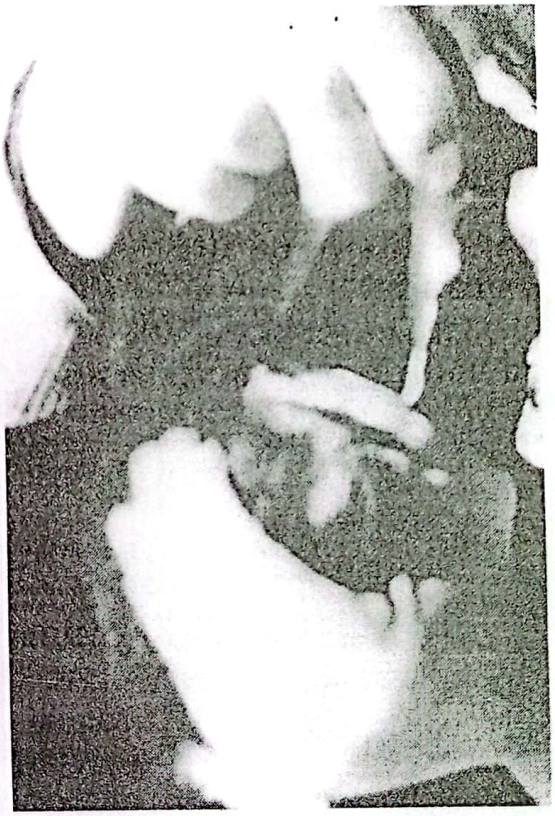

Fig.4: Palatoschisis in a 2 day-old female Friesian calf. Note the congenital fissure (split) on the hard palate and the buccal cavity was connected to the nasal cavity.

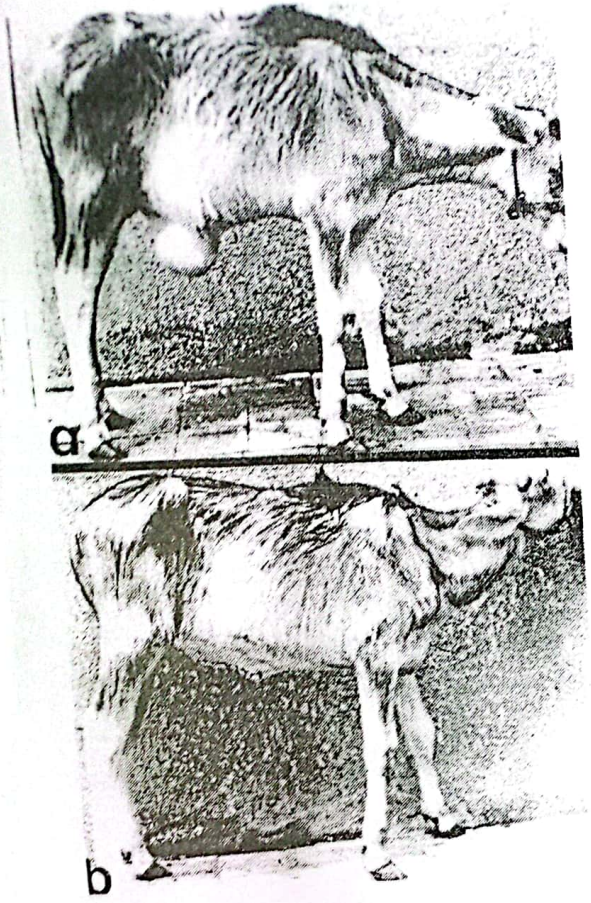

Fig. 5:Umbilical hernia in a 3-month-old female buffalo calf (a) and the same animal after operation (b).

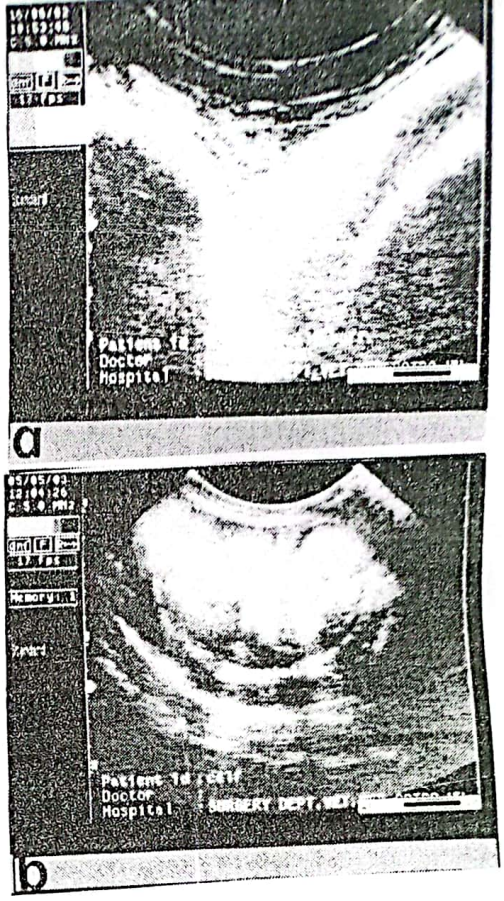

Fig. 6:Ultrasonographic scans of the hyperechoic hernial defect (a), hernial sac and its intestinal contents (b) (5Mhz mechanical sector transducer).

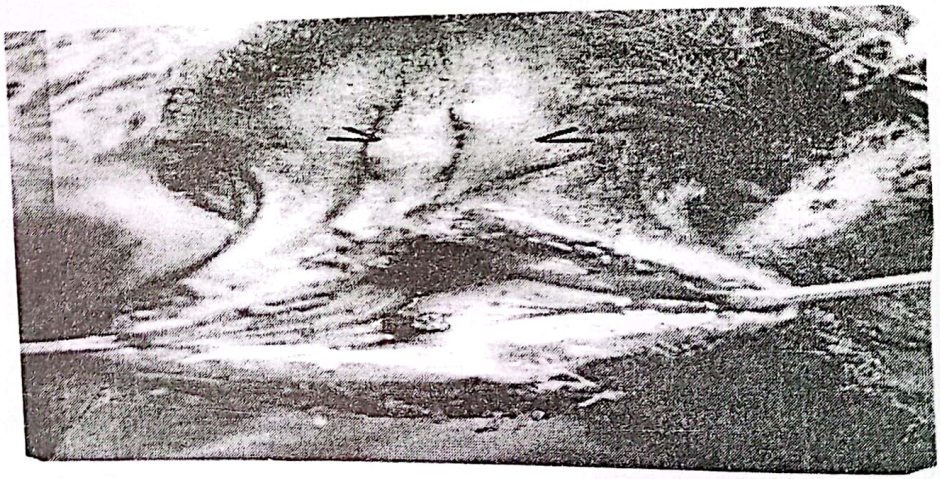

Fig.7: Epitheliogenesis imperfecta with visceral eventration at umbilicus in two-day-old female buffalo calf (a). Note, the deep red intestinal loops prolapsed at the umbilical region (b).

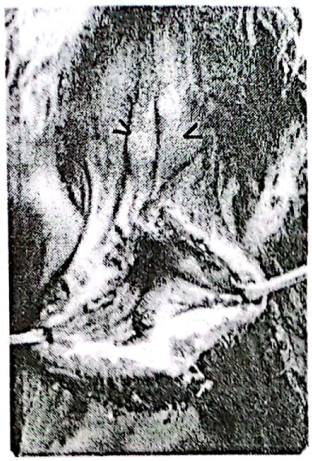

Fig.8: Atresia ani and rectovaginal fistula in a 3-month-old female Balady calf. Note, the absence of anal opening (arrows) and the fecal matter soiling the vulva.

Fig.9: Carpal vulgaris in a 45-day-old female buffalo calf. Both carpi were tied - in while the distal limbs were tied-out.

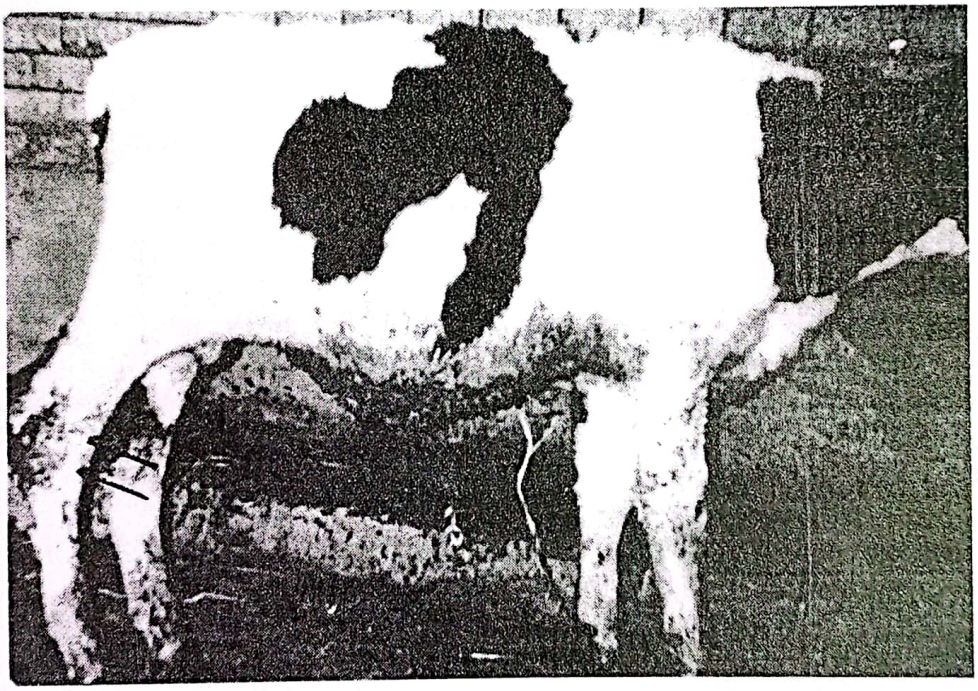

Fig. 10: A 3-month-old male Friesian calf showing bilateral straightness (wide angle) of the hock joints (arrows).

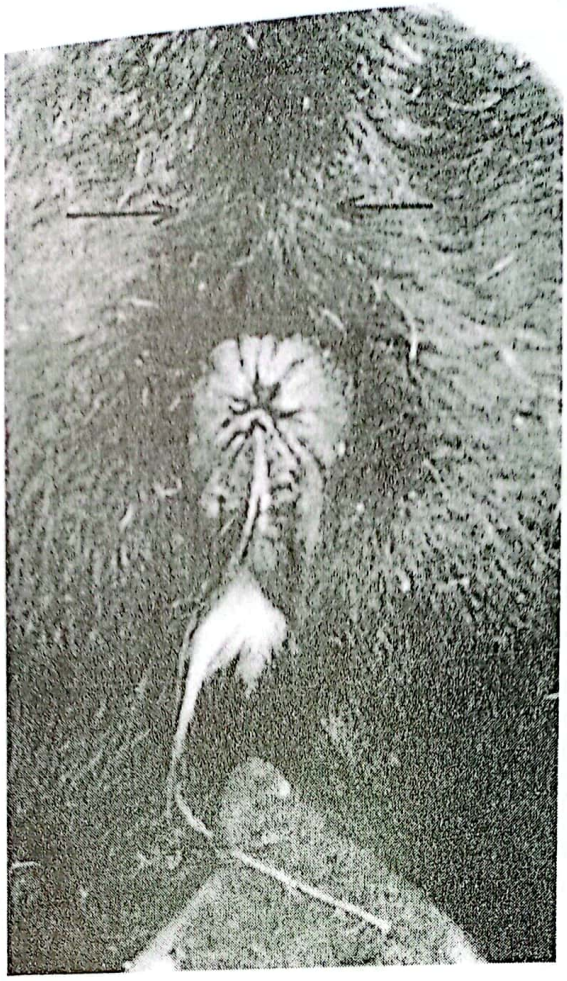

Fig.11: Tailessness in a 2-month-old female Friesian calf. Note; the absence of the tail from its base (arrows).

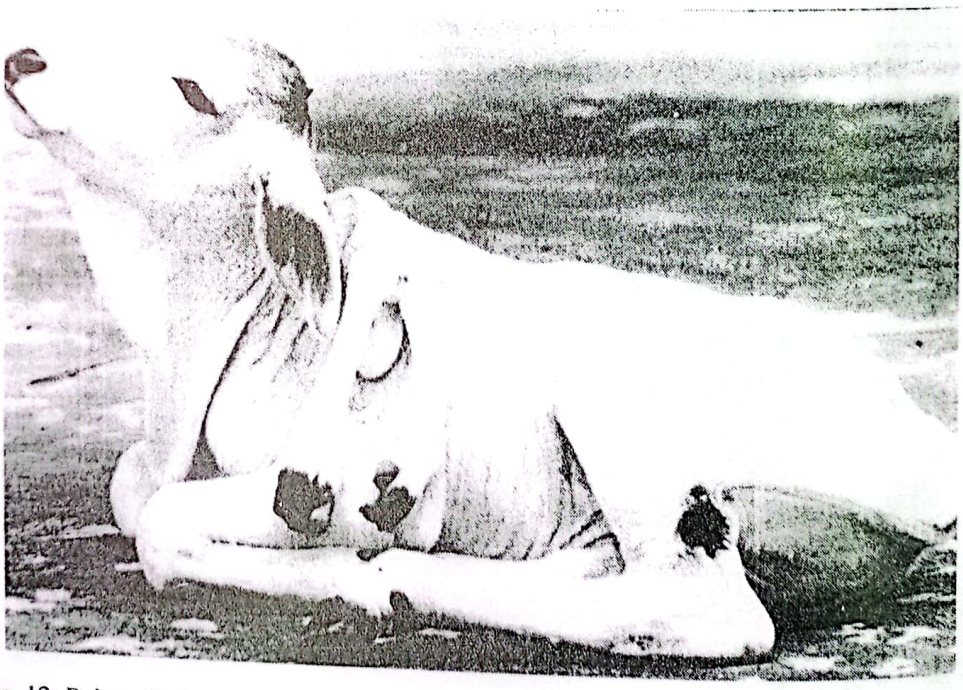

Fig. 12: Polymelia in a 5-month-old male native calf . There are two extra-limbs attached at withers.

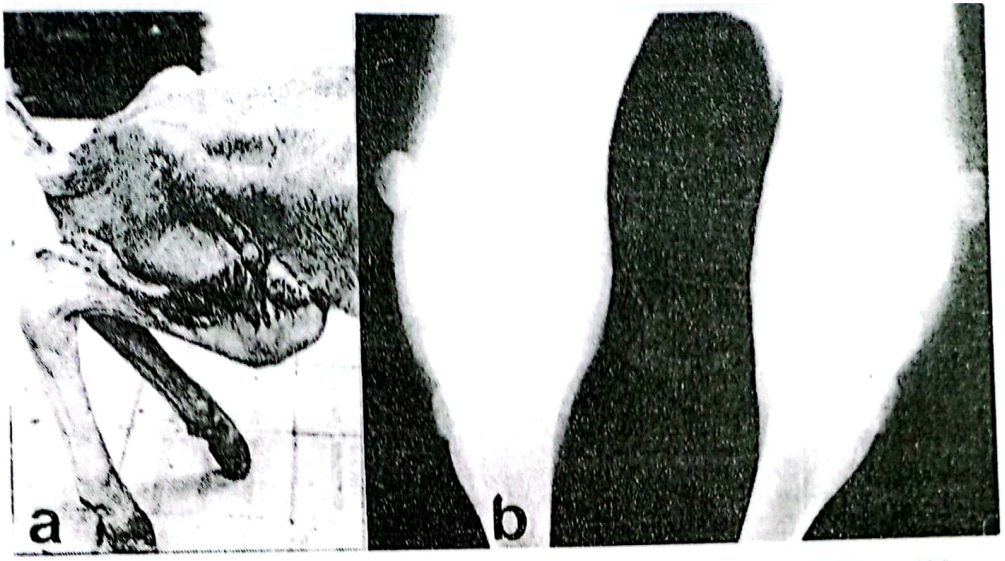

Fig.13: Bilateral patellar ectopia in a one-week-old female Balady calf. The calf is unable to stand on both hind limbs (a). The X-ray image shows bilateral lateral patellar luxation (b).

DISCUSSION

In the present work, the incidence of congenital anomalies among the examined animals was 4.5%. This incidence is higher than those recorded by EL-Maghraby (1988) and Abd-Elbaset, et al.(1992). This could be explained by the present high number of heterochromia iridis in buffalo calves. Anyhow, such incidences may reflect the economic importance of congenital anomalies (Radostitis, et al. 2000).

Concerning the etiology of congenital anomalies, data taken from local farmís records, rather than sporadic cases, are incomplete to follow the possible teratogens/cross mating. Such difficulities were also reported by Dennis, et al. (1975); Ojo, et al. (1981) and Nigam, et al. (1984). However, most of the anomalies reported here could be due to the interaction between genetic and environmental (toxic, infectious and nutritional) factors. Moreover, clinical and pathological examinations offer the opportunity to detect the etiology that based on certain teratogenes are known to be the cause of certain lesions (Roberts 1986 and Radostitis, et al. 2000).

In the present work, congenital anomalies of the head represented predominant one (51.2%) due to the high incidence of heterochromia iridis followed by those of thorax and abdomen (32.1%).

Heterochromia iridis was the most common anomaly in the present study representing 5% of the total examined buffalo calves. It was diagnosed as unilateral or bilateral condition with higher incidence of the later form. These findings are more or less similar to those recorded by Misk et al.(1998). In addition, this anomaly has been reported in pigmented cattle as well as in

cattle with complete and incomplete albinism (Gelatt et al.1976 and Severin et al. 1980).

Defective calves with bilateral cheilognathoschisis and palatoschisis were more or less similar to those described by Bose, et al. (1982); Kenawy (1984); Sen et al. (1984); Deeb (1987); Soliman, et al. (1987); Shawki (1990); and Blowey and Weaver (1991). These conditions may be due to facial developmental defect of genetic origin (Oehme and Prier 1976 and Moritomo et al. 1999). On the other hand, Radostitis, et al. (2000) mentioned that cheilognathoschisis could be due hypovitaminosis A in piglets. Plalatoschisis was mostly associated naturally and experimentally with multiple flexion contractures (Binns, et al. 1972; Leipold, et al. 1970; 1973; 1974&1986; Greene, et al. 1973;Van-Huffel and Demoor, 1987 and Panter, et al. 2000).

Umbilical hernia represented the second more common congenital anomalies in the present report (30.9%). All umbilical hernias were reducible and most common in Friesian calves (19/26). It is though to be hereditary in this breed (Angus and Young, 1972; Hayes, 1974 and Assmus and Surborg, 1978). Apart from a voluminous umbilical hernia, all cases were reducible. This is in agreement with that mentioned by Gohar, et al. (1987); Youssef, et al. (1993) and Senna, (1994). Ultrasonographic examination was a helpful tool in detection of the length of the hernial defects, size and contents of the hernial sac (Abu-Seida, 2002).

Atresia ani either alone or with rectovaginal fistula represented 9.5% of the total defective calves. The condition results when the membrane separating the endodermal hindgut from the ectodermal anal membrane fails to perforate (Dreyfuss and Tulleners. 1989 and Martens, et al. 1996). In the present cases, no needs for oral contrast material for detection of the site of occlusion as mentioned by Sen and Banerjee, (1992). Surgical creation of an anal opening was found adequate in the defective cases (Singh, et al. 1982; Misk, et al. 1983; Jennings, 1984; Nigam, et al. 1984; kenawy, 1988; Nakao, et al. 1993 and Martens, et al. 1996).

Skeletal congenital anomalies represented 7.2% of the total congenital defects. Congenital defects of musculoskeletal system were common defects in cattle (Greene, et al. 1973). Congenital angular limb deformities are though to be resulted from in utero malpositioning of the foetus. Abnormally straight hock (straightness > 170°) often develop degenerative joint disease of the coxofemoral, femorotibial and tibiotarsal-metatarsal articulations, mainly as a result of indirect trauma (Greenough and Weaver, 1997).

Taillessness in calves could be of little clinical importance but a hereditary basis for the defect in Holstein breed was evident (Huston and Weardeen, 1958). This anomaly lowered the economic value of the affected calf. Similar cases were re-

ported by Abdel-Hamid, et al. (1987) and Shawki (1990).

However, the case of polymelia did not cause dystocia, embryonic duplication is important in cattle reproductive economics. It could be an example of unequal and assymmetrical conjoined twins or related to abnormalities of apical ectodermal ridge (Johnston, 1985 and Roberts, 1986). Attachment of extra-limbs only with the skin and soft tissues at the withers made the surgical intervention easier. Two similar cases of polymelia were also reported by Abd-Elbaset, et al. (1992).

The present clinical symptoms of calf with bilateral patellar ectopia were the same as reported by Kenawy (1991). Patellar luxation is one of the most frequent congenital anomalies seen in dogs and has four grades (Hammer, 1979). Manual attempts to replace the patellae to their correct positions were unsuccessful. On the other hand, surgical correction was not completely promising (Kenawy, 1991 and Greenough and Weaver, 1997).

In conclusion, congenital anomalies among calves are of clinical and economic importance. Breed selection should be highly considered, in order to reduce the hereditary factor, the main factor of congenital anomalies in the bovine family. Moreover, an early diagnosis is helpful for their correction by surgical interference.

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