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ORIGINAL ARTICLE

Kidney Weight gain during Prenatal Development in *Camelus dromedaries* Embryos

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ABSTRACT
This study was carried out to investigate the weight of kidney in the fetal stage of Camelus dromedaries by digital scales. In the experiment sixty numbers of Camelus dromedaries Embryos were selected based on their crown-rump length and subsequently divided into 6 age groups consisting of 10 animals in each group. group I (60 days), group II (120 days), group III (180 days), group IV (240 days),group V(300 days) and group VI (360 days).in fetus of about 60 days, kidneys demonstrated circle shape and No renal pelvis was evident in all kidneys under study. In the 120 days old foetuses,bean shape kidneys were present ,renal pelvis was distinct and extensive with a well developed ureter that originated from the middle of the pelvis in both left and right kidneys. The most increase weight gain was demonstrated between group I and II.
***KEY WORDS**: Camelus dromedaries, Kidney, Weight, growth*

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INTRODUCTION

The kidney is an important organ involved in the removal of unwanted nitrogenous substances, excess water and relative maintenance of osmotic concentration of the blood. Certain features of the renal anatomy of different mammals and variations with the aridity of their habitat have been reported [17] .The anatomy and histology of the adult kidney of domestic animals is described in numerous textbook of histology and anatomy [6, 4,2 and 16] also numerous research studies investigated kidney development and morphology: The morphometric observations on the kidney of camel [8], One Horned Rhinoceros [18] , biometrical study of the kidney of buffalo [11], morphometric study on kidney of African rat[1],Histogenesis of human renal cell[3],Measurement of renal dimension [14].The available reports were entirely concerned with adult structures of the kidney and much less has been written about the prenatal development of the kidney in camel. In this research weight gain and other detailed sequential changes involved in the development of the kidney in one-humped camel (*Camellus dromedaries*),an important breed of camel in Iran, will be described.

MATERIAL AND METHOD

Kidneys used for this study were obtained from 60 fetuses,(10 specimen from each group).camel uteruses were gathered from slaughter house in Yazd province .after dissecting the uteruses ,the age of fetuses were meagered by crl formula(using crown-to-rump length),
(Age of fetus) = crl +23.9 / 336, according to Mcgeady [13], these foetii were fixed in 10% buffered formalin solution. The kidneys from these animals were collected by abdomino-sternal approach and were refixed in 10% buffered formalin solution, for 48 hours. Then the weight of the kidneys was recorded (fig 1). The greatest length, width and thickness of the kidneys were measured by digital Vernier Calipers, separately for right and left kidneys (fig.2).

Fig.1: measurement of kidney weight with digital scale in camelus dromedaries Embryos. (60 days old)

Fig.2: measurement of kidney parameters with digital Vernier calipers in camelus dromedaries Embryos. (60 days old)

RESULTS AND DISCUSSION

Both kidneys were irregularly elongated and reddish-brown in color in vivo. In fetus of about 60 days, kidneys demonstrated circle shape, with the advancement of age, kidney morphologically shifted to bean-shape which present in group II, III, IV, V and VI .all kidneys were smooth and covered with a thin fibro-muscular capsule. The kidneys in group I, II and III were found below the lumber transverse processes, except animals of group IV, V and VI where the kidney detected more cranially.in group IV, V and VI right kidney were shifted rostraly more than left kidneys .Malik & Vais [12] also reported that the right and left kidneys shifted rostral with advancement of age in ruminant. No renal pelvis was evident in group I in all kidneys under study. However, from group II onwards, the renal pelvis was distinct. This observation confirms the development of renal pelvis and ureter in early phase of the gestation period in camelus dromedary's embryos. Biometrical parameters pertaining to right and left kidneys of different age groups have been measured [Fig 3].

Fig.3: Measurement of kidney in terms of various biometrical parameters in *Camelus dromedaries* Embryos.

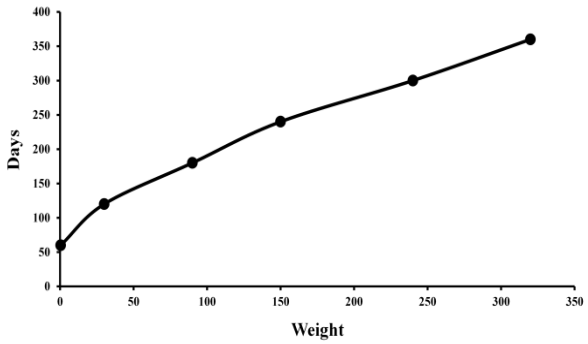

Fig.4: diagram shows weight gain of kidney in different ages of *Camelus dromedaries* Embryos.

The values pertaining to the weight in all groups have been recorded as the below: in group I(60 old fetuses)weight of kidney is./4±1gr, in group II(120 old fetuses) weight of kidney is30±2gr,in group III(180 old fetuses)weight of kidney is90±5gr, in group I V(240 old fetuses)weight of kidney is150±5gr, in group V(300 old fetuses)weight of kidney is240±5gr, in group VI(360 old fetuses)weight of kidney is320±1gr in fact ,In the present study, maximum weight gain was observed between group I and II kidneys, and no significant difference was noticed in the left and right one. However, the increase in weight of both left and right kidney between other groups were lower than 2 first groups(fig.4).weight gain between groups II and III relatively represents steep slope but the weight gain of the other groups, shows a relatively gentle slope. Weight gain in the second group, was 75 times higher than first group. Weight gain in the third group, was 3 times higher than second group. Weight gain in the fourth group, was 1/6 times higher than third group. Weight gain in the fifth group, was 1/6 times higher than forth group. Weight gain in the sixth group, was 1/3 times higher than fifth group.in fact weight gain between group I and II is in the peak, after 120 days of gestation we have partially increase in weight between different groups. our finding suggested that highest percentage of growth in weight of both kidneys, were documented between group I &II was highly significant($P<0.01$) but percentage increase in growth in weight of both kidneys between group II and IIIgroup III and IVgroup IV & V was not significant (P=0/1).this result indicated that a greater embryogenesis of both kidneys pertaining to the early stages of development in camelus dromedaries embryos Similar findings were also reported in fetal goats [12]. Similar patterns of embryonic growth were recorded in cerebral ventricles [9] and scrotum [10] in fetal goats. Statistical analysis revealed that, the weight of kidneys varied highly significant ($p<0.05$) between group I and II however, low significant difference was noticed for the same in other age groups. The variation in growth between the left and right kidneys in terms of weight in all groups were not significant ($p<0.01$).

So, The variation in growth among the various groups pertaining to embryonic life of the right and left kidney in terms of weight, was significant ($p< 0.01$),although variation among groups I to II, indicative of better sequence of growth phase in both kidney as compared to the other groups. This trend of growth was accordance with the findings of Patten & Carlson [15], who reported that variable growth and structural diversities at different stages of development of an organ is a normal phenomena for accommodating and molding of the organ. According to Farbman [5], there is an intimate relationship between the feeding habits and the development of the most organs. Studies by Tisher [19] have shown that rhesus monkey produced concentrated urine in the absence of a well developed inner medulla and loop of henle.Moutairou et al, [7] have also suggested that protein binding mechanism involving calbidin might be responsible for the ability of the rat to live with restricted drinking water. According to M.A.Abdalla et al [8]anatomical requisites for the production of concentrated urine are to be found in the kidney of the camel, but further studies will be needed to elucidate this fact that special anatomical adaptation in the urinary system for water economy originated from prenatal period and continued in the postnatal life.

REFERENCES

1. B.I,Onyeanusi.,A.A,Adeniyi.,J.O,Ayo . & J.O, Nzalak. (2007) . Morphometric study on the kidney of the African Giant rat .Journal of animal and veterinary advances. 6(11):1273-1276.
2. Dyce, K.M., Sack, W.O. & Wensing, C.Y.G.(1995).Text book of Veterinary Anatomy., Sanders Company.,PP: 136.
3. El-kott, AF.,Ismael, MF.,Ei-Moneim, MM. & Ei-Baz ,Ma.(2005).Histogenesis of human renal cell carcinoma by using electron microscopy and immunohistochemical techniques.,Int Urol Nephrol.,37(3):439-45.

4. Eurell,J.A.,B.L,Frappier & H,Dellman.,(2006).Textbook of veterinary histology.,6th Edn.,Lea . & Febiger, Philadelphia. pp: 174-175.
5. Farbman, A. I & M.biene, J.P., (1991). Early development and innervations of taste bud-bearing papillae on the rat tongue. J. Comp. Neurol., 304: 172-186.
6. Fawcett, D.W. & E.Raviola.,(1994).Bloom and Fawcett, a Textbook of histology.12th End., Chapman and Hall new York.
7. K, Moutairou., N, Hayez., V. Pohl., G. Pattyn . & R .Pochet., (1996).Calbindin localization in African giant rat kidney (Cricetomys gambianus) ., Biochim Biophys Acta., 1313(3):187-93.
8. M.A, Abdulla. & O, Abdalla. (1979). Morphometric observations on the kidney of the camel, camelus dromedaries. J.Anat. 129(1):45-50.
9. Malik, M. R., Taluja, J. S. &Parmar, M. L., (1992). Histogenesis and mode of growth of choroids plexus in goat fetuses. Indian J of Animal Sciences. 62(12):1151-9.
10. Malik, M. R., Taluja, J. S. & Parmar, M. L.,(1995). Histogenesis and mode of growth of scrotum in fetal goat, Indian J of Animal Sciences., 65(4):409-13.
11. Malik, M. R., Tiwari, G. P & Singh, A. P., (1978). The biometry of the kidney of buffalo (Bubalus bubalis), J of Anatomical Society of India., 27:11-4.
12. Malik, M. R., Vais, Rakhi., (1998). Morphogenesis of kidney in goat (Capra hircus). Indian J of Veterinary Anatomy, 11(2):161-7.
13. McGeady,T.A.,Quinn,P.J.,Fitzpatrickand,E.S,Ryan,M.T.,(2006).Veterinary embryology.1st ed. Blackwell publishing ,pp:331-336.
14. Moorthy, H.K., Venugopal, P.,(2011).Measurement of renal dimensions in vivo: A critical appraisal., *Indian J urol*.,27(2):169-75.
15. Patten, B. M., Carlson, B. M.,(1977). Foundations of Embryology. 3th Edn, Tata McGraw Hill, New Delhi.
16. Sisson, S., (1975). Ruminant Urogenital system. In Sisson and Grossmans: The Anatomy of the Domestic Animals. 6 Edn., W.B.saunders Company. pp: 937-9.
17. Sperber, I.,(1944).Studies on the mammalian kidney. Zoological Bidrag fran Uppsala. 22:249-432.
18. Talukdar, M., Sarma, M., Dev Choudhury, K.,(2003). Macro morphology of Kidney of One Horned Rhino calf, *Indian J of Animal Sciences*., 73(2): 184.
19. Tisher, C.C.,(1971).Relationship between renal structure and concentrating ability in the rhesus monkey., *American journal of physiology* ., 220:1100-1106