

## CLINICAL STUDY ON DIVERSE SURGICAL AFFECTIONS OF OESOPHAGUS IN BUFFALOES

Satyaveer Singh\*, Praveen Bishnoi, Sakar Palecha, Rakesh Kumar, Narendra Singh and Satveer Kumar

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### ABSTRACT

This Article presents the detailed study of oesophageal affections of buffaloes recorded in the clinic of Department of Veterinary Surgery and Radiology VCC CVAS, RAJUVAS, Bikaner Rajasthan India. Different clinical symptoms, types of affections, etiology and postoperative complications were recorded, plane and contrast radiographic study was carried out and affections were categorized based on their diagnosis. Complete obstruction was present in the highest number followed by diverticulum. The site of obstruction in most of the animal was distal cervical regional close to the thoracic inlet and impacted plastic and tarpaulin was the most impacted material retrieved in the oesophagotomy procedures. Conservative and surgico-therapeutic treatment was carried out. Rupture of oesophagus was noticed as a consequence of complete obstruction at proximal site in delayed presented cases. Narrowing of oesophagus noticed at mid cervical region because of the fibrosis of the oesophagus. Dilation of oesophagus was present in consequences of chronic obstruction and chronic history of ailments. Penetrating foreign bodies mostly sharp needles were present at proximal oesophagus. Early

presented cases having healthy mucosa showed the successful outcome and chronicity of the condition resultant in complications and poor prognosis.

**Keywords:** *Bubalus bubalis*, buffaloes, Oesophageal affections, obstruction, complications, surgicotherapeutic treatment

### INTRODUCTION

Bovines are more susceptible for obstructions and other surgical conditions of the oesophagus as compared to other species (Singh *et al.*, 2021). Strong deglutition reflexes of oesophagus in buffaloes make it more vulnerable for various affections. Indiscriminate feeding habits additionally increases the probability of these disorders which results into serious consequences like bloat, rupture or perforation of oesophagus, perioesophageal migration of sharp foreign bodies, fibrosis which results into stenosis, dilation of oesophagus and development of fistula (Haven, 1990; Jhirwal *et al.*, 2016; Mahesh and Ranganath, 2016; Singh *et al.*, 2016; Singh *et al.*, 2017). Oesophageal fistula is manifested by dropping of cud from the cervical opening (Mahesh

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Department of Veterinary Surgery and Radiology, Rajasthan University of Veterinary and Animal Sciences, Bikaner, India, \*E mail: [satyaveersingh4@gmail.com](mailto:satyaveersingh4@gmail.com)

and Ranganath, 2016). Complete obstructions are the acute and emergency condition which requires immediate removal of obstruction either by conservative or surgical procedure. So many case studies of oesophageal affections related to complete and incomplete obstruction have been published in ruminants (Suresh Kumar *et al.*, 2010; Hari Krishna *et al.*, 2020; Singh *et al.*, 2021) but detailed description of oesophageal affections is still needed to be addressed. The present study describes various affections, clinical symptoms, foreign bodies, diagnostic procedure and complications in buffaloes related to oesophagus.

## MATERIALS AND METHODS

5 years data from 2014 to 2019 of buffaloes were studied related to oesophageal affections in the Department of Veterinary Surgery and Radiology TVCC CVAS, RAJUVAS, Bikaner Rajasthan India. Clinical history was recorded by the owner. All the cases had a history of acute to chronic condition. Complete obstruction cases were recorded 12 h to more than 5 days. All the oesophageal affections were categories and recorded according to clinical symptoms, history from owner and confirmation of the affections as per plain and contrast radiography. All the cases were subjected to either conservative or surgical procedures. Associated complications of surgical procedures and consequences of the affections were also recorded. Clinical symptoms observed in all the affections were almost similar *viz* regurgitation of feed through mouth and nostrils, swelling at obstructive site of cervical region, salivation, foaming and respiratory distress. Some animals affected with dialation were able to swallow liquid feed but not the solid feed, stretching of neck and

holding the feed in mouth for some time was more pronounced in case of stenosis.

## Diagnosis

Diagnosis of the all the affections was based on the clinical symptoms and radiography. Contrast radiography was helpful to differentiate the diverse affections. Plain radiographic views were helpful for penetrating and radiopaque foreign bodies. Probang passed in the oesophagus to confirm the obstructive site other than sharp objects. Oesophageal stricture, diverticulum and radiolucent foreign body were confirmed by contrast radiography using barium sulphate paste.

Oesophageal obstruction is evident by hard swelling at ventrolateral aspect of distal cervical oesophagus. Lateral radiographic view reveals the obstructive compact foreign body at thoracic (Figure 1A and B).

Contrast radiography confirmed the site of obstruction particularly in radiolucent foreign body which could not diagnosed with plain radiography. The third picture is a sharp linear foreign body in oesophagus (arrow); its presence in oesophagus confirmed by contrast radiograph (Figure 2).

Oesophageal dialation (Figure 3A) and megaesophagus (Figure 3B) cases were presented with fluctuating large sized swelling at ventral cervical region. Radiographic view confirmed the accumulation of liquid in large pouch sized structure; these radiographic views have the radiographic artifacts showing double tracheal radiolucency. Last picture showing oesophageal dialation during surgical procedure.

Oesophageal stricture/stenosis was confirmed by contrast radiography (Figure 4A). Exposed oesophagus lost its normal consistency in this case, giving the texture of fibrotic lump during oesophagotomy (Figure 4B).

Plain radiographic view revealed the radiopaque foreign body (Figure 5A), rupture of oesophagus evident by emphysema and feed material surrounding the trachea. Rupture of oesophagus was confirmed by feed material (Figure 5B) at surgical site during oesophagotomy.

## TREATMENT

Oesophageal obstruction was treated by conservative and surgical procedures. Conservative treatment followed by manual retrieval and dislodging the obstructive material by using the probang into the rumen. These procedures have been recommended and are in routine practice by veterinary surgeons to treat the affections of oesophagus. (Singh *et al.*, 2008; Hari Krishna *et al.*, 2020). Cases in which conservative treatment failed, oesophagotomy were performed in right lateral recumbency and probang was placed up to the level of obstruction. The obstruction site was prepared aseptically. Lignocaine hydrochloride 2% was infiltrated at site of obstruction. The oesophagus was approached between the sternocephalicus muscle and trachea. After exposing the oesophagus, atraumatic clamps were placed proximally and distal to obstruction and site was packed off to avoid contamination. Longitudinal incision was made just cranial to site of obstruction and the obstructive foreign bodies were squeezed cranially towards the incision site and removed.

Oesophageal diverticulum cases were treated after exposing the oesophagus; the diverticulum was grasped with non-crushing clamp on its neck and then resected between clamp and oesophagus. Oesophagus was thoroughly cleaned with normal saline. Suturing of oesophagus and postoperative care was done as described above

for treatment of obstruction. In case of penetrating foreign bodies foreign bodies were retrieved after approaching oesophagus from pharyngeal region and surgical site gently and in two cases it was retrieved after oesophagotomy (Singh *et al.*, 2017). Oesophageal stricture cases were treated surgically by performing oesophagotomy as described by Singh *et al.* (2008). A longitudinal incision was given over the stenosed part including some normal oesophagus on both sides. Then stay suture was applied one centimeter away on either side of middle of the line of incision and drawn away to convert longitudinal incision into transverse incision. Megaesophagus cases were not treated; owners were advised to feed on soft diet, oral electrolytes and intravenous fluids.

Oesophagus was sutured by using two rows of sutures, first layer by Connell and second layer by continuous suture pattern using vicryl no. 0. The muscle layer and skin were sutured using cat gut no 2 and silk no 2. Oral feeding was withheld, and animals were maintained on fluid therapy for 5 days. Post-operative care was provided for with Ceftriaxone 15 mg/kg b.wt. I/V and Meloxicam 0.3 mg/kg b. wt. I/M once daily for five days. Antiseptic dressing was done using povidone iodine until removal of sutures. Oral feeding was allowed after 5 days of operation with liquid and soft diet initially then shifted on normal feed.

Foreign body was retrieved, non-crushing clamps were applied proximal and distal site of obstruction and site was flushed with normal saline. A leather piece mixed with feed was retrieved from oesophagus (Figure 6).

Wound dehiscence and development of fistula were the common associated complications after operating procedures. Postmortem findings in long standing cases confirmed the feed material in surrounding tissue of ruptured oesophagus at

different points. White structure is the mucosal layer (Figure 7) of oesophagus having perforation and having feed material.

The outcome of healthy and shiny mucosa (Figure 8A) had a good prognosis. Devitalized mucosa (Figure 8B) and oesophagus (Figure 8C) could not hold the suture material and prone for postoperative complications.

## RESULTS AND DISCUSSION

Most diagnosed affection was obstruction followed by diverticulum; sharp foreign bodies in oesophagus condition were presented in least number. 10- Cases of obstruction were cured by conservative treatment. In 7 cases probang pushed the obstructive material in rumen and in 3- cases manually retrieved from pharyngeal region after application of probang. Site of obstruction at thoracic inlet or distal oesophagus was present in 21 cases at mid cervical in 6 cases and 2 cases it was present in thoracic part of oesophagus, 11 cases were survived the oesophagotomy which presented in early stage of obstruction, within 48 h and 12 cases of obstruction including operated cases of ruptured oesophagus had the complications and could not survived after operation and all these cases presented after 48 h when devitalized mucosa was observed in most of the cases. Two cases were not operated on due to animals had presented in respiratory stress condition. Etiology of obstruction in present study was impacted feed, tarpaulin, bunch of polythene, leather pieces, ropes, phytobezoars and trichobezoars were the materials which recovered in oesophagotomy (Gangwar *et al.*, 2013; Singh *et al.*, 2021). Prone factors for oesophageal obstruction in pregnan buffaloes due to increased nutritional requirement and pica

condition while in young calves due to difficulty to adopt during transition period from milk feeding to fodder is reported (Shivprakash, 2003).

5 cases of oesophageal diverticulum were operated but only one cases could survived others had died after complications. Sharp foreign bodies were successfully retrieved after exposing the oesophagus but two cases were succumbed to complication of aspiratory pneumonia. Ruptured cases of oesophagus; only one case survived after surgical procedure other succumb to complications.

In present study oesophageal affections were recorded as obstruction, diverticulum, megaesophagus, penetrating foreign body (Haven, 1990; Singh *et al.*, 2017) and stricture (Craig *et al.*, 1989). Plain and contrast radiography are helpful in diagnosis the different conditions of the oesophagus (Singh and Singh, 1999). Ultrasonographic diagnosis of oesophageal obstruction in cattle and buffalo has been reported by Kumar *et al.* (2016); Manjunath *et al.* (2018).

The major clinical sign recorded were regurgitation and salivation; however, tympany was observed in cases of complete obstruction and megaesophagus, intake of water and liquid diet, difficulty in swallowing, coughing and cessation of rumination were also observed as important clinical signs. These clinical signs were well correlated with history and found effective in diagnosis of conditions (Jadhao *et al.*, 2002).

Most of the obstructive sites in present reported cases were at thoracic inlet Yadav *et al.* (2008), however in few cases it was diagnosed at proximal part of cervical oesophagus Suresh Kumar *et al.* (2010). Complete, incomplete and partial obstruction of oesophagus at different anatomical location of oesophagus in water buffalo is reported by Marzok *et al.* (2015).

Oesophageal obstructions in bovine

commonly occur at pharynx, cranial aspect of cervical esophagus, thoracic inlet or base of heart (Yadav *et al.*, 2008; Madhava *et al.*, 2009). Diagnosis of such problems depends on the history of eating particular foodstuff and clinical signs as bloat, tenesmus, retching and salivation. External palpation may be used to confirm those located in cervical esophagus (Haven, 1990). Tricho-phytobezoars are compacted spherical or ovoid masses of hair that provide a rare but reported source of esophageal and gastrointestinal obstruction in bovine medicine (Radostits *et al.*, 2000). Incidence of trichobezoar related pathology is higher in late winter to early spring, correlated with increased ingestion of hair during shedding. Lack of dietary forage may trigger 'grazing' on penmates or may compulsively lick their own coat. Infection with Sarcoptic mange or pediculosis promotes grooming and licking, predisposing animals to trichobezoar formation (Gangwar *et al.*, 2013).

In present study sharp foreign bodies diagnosed radiographically and retrieved manually from proximal cervical region as well as surgically after exposing the oesophagus with and without oesophagotomy (Singh *et al.*, 2017). Singh *et al.* (2016) reported a penetrating foreign body in paraoesophageal region in a cow presented with

history of dysphagia, drooling of saliva, dull and depressed. Using of probang in case of sharp and penetrating foreign bodies should be avoided which can cause the rupture of oesophagus (Singh *et al.*, 1991).

In present study cases of megaesophagus were diagnosed by contrast radiography and treated in conservative manner consisted of feeding management oral electrolytes, intravenous fluids, and systemic antimicrobial therapy as described by Amin and Hashemiasl (2015) but prognosis was not favourable in any case. Megaesophagus rarely occurs in ruminants and sporadic cases have been reported which can be segmental or generalized in whole length (Heaven, 1990). Chronic obstruction of oesophagus and accumulation of feed and water at proximity of obstruction and stricture causes the pressure on inner side of oesophagus and results in its dialation or it can be congenital (Braun *et al.*, 1990). Sasikala *et al* (2018) endoscopically diagnosed congenital megaesophagus in six murrh buffalo calves, aged between fifteen days to two months with history of inappetance, regurgitation and salivation. Motility dysfunction and pharyngeal trauma hamper normal physiology of oesophagus which lead to its dialation (Blikslager and Jones, 2009). Secondary inflammatory injuries of vagus nerve are also associated with

Table 1. Diagnosis of different surgical conditions of oesophagus in buffaloes.

S.N.	Type of Affections	No. of Cases
1	Oesophageal obstruction	28
	Oesophageal obstruction with ruptured oesophagus	7
2	Oesophageal Stricture/stenosis	6
3	Oesophageal dialation / megaesophagus	8
4	Oesophageal diverticulum	10
5	Penetrating Foreign bodies	5

Table 2. Outcome of Surgico-therapeutic treatment and associated complications in buffaloes affected with oesophageal affections.

S.N.	Affections	Total no. of cases presented	No. of cases treated	Treatment	No. of cases cured	Complication
1	Oesophageal obstruction	28	28	Surgico-therapeutic and Conservative	21	Rupture, fistula formation, Abscess, subcutaneous emphysema and cellulitis
	Oesophageal obstruction with rupture	7	5	Surgico-therapeutic	NIL	Emphysema and respiratory distress and fistula formation
2	Oesophageal Diverticulum	10	5	Surgico-therapeutic	1	Rupture, fistula formation, Abscess and cellulitis
3	Oesophageal stricture	6	3	Surgico-therapeutic	NIL	Oesophageal rupture within 48 h
4	Megaesophagus	8	2	Conservative	NIL	Feed stasis and bloat
5	Penetrating foreign body	5	4	Surgico-therapeutic	2	Aspiratory pneumonia and Emphysema





Figure 1. Oesophageal obstruction-complete (A and B).



Figure 2. Contrast radiographs (A, B and C).



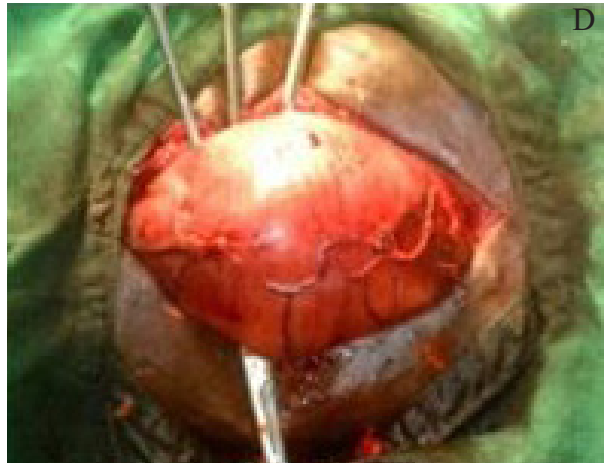
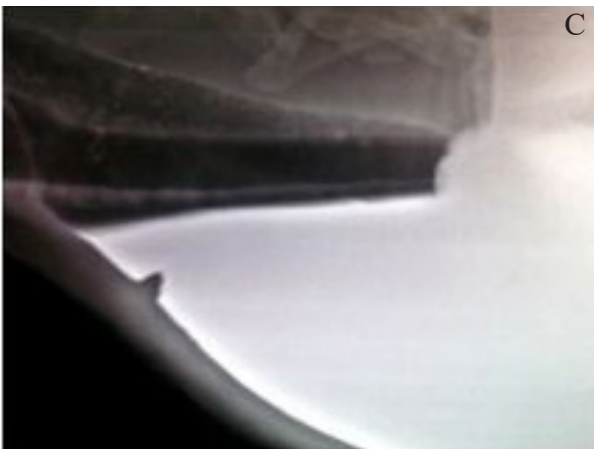


Figure 3. Oesophageal diverticulum/ Megaesophagus (A, B, C and D).

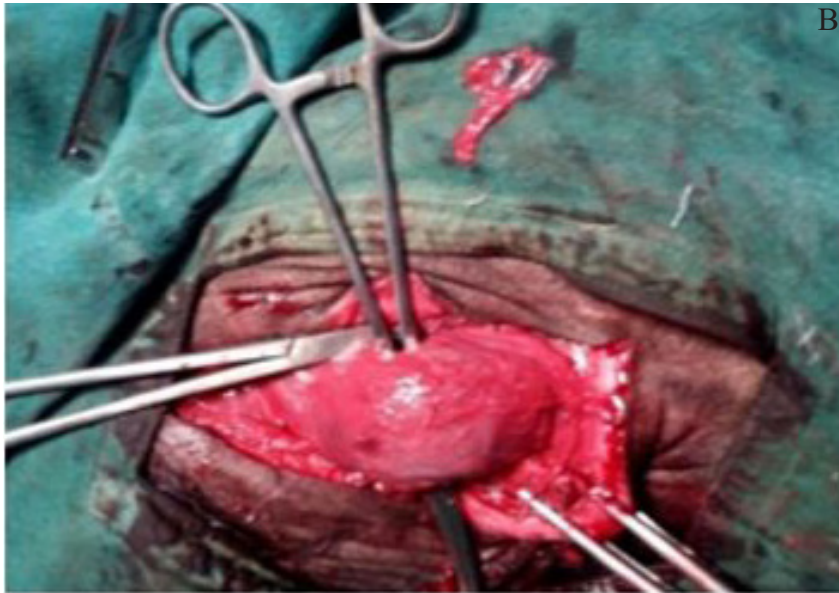


Figure 4. A: Oesophageal stricture, B: Stenosis.

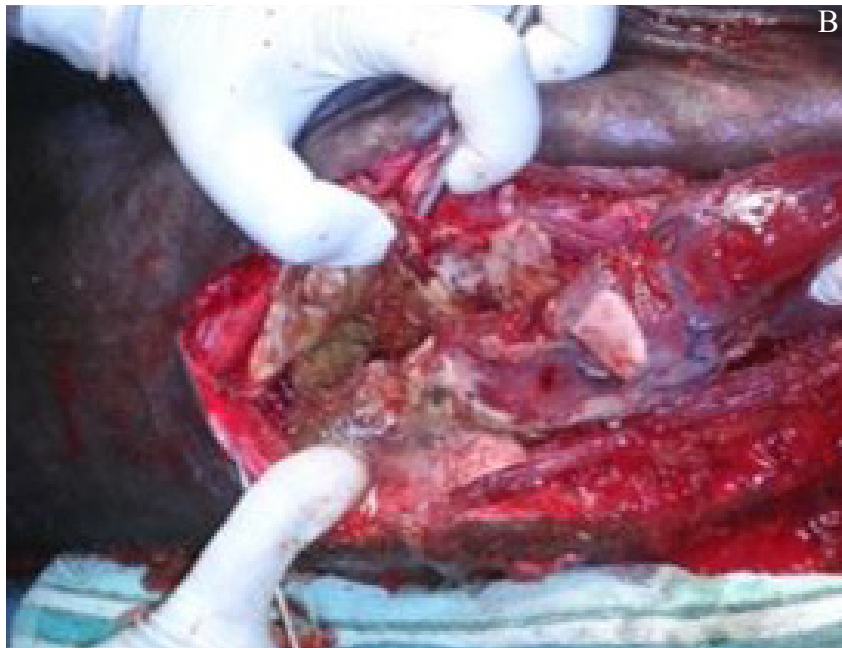
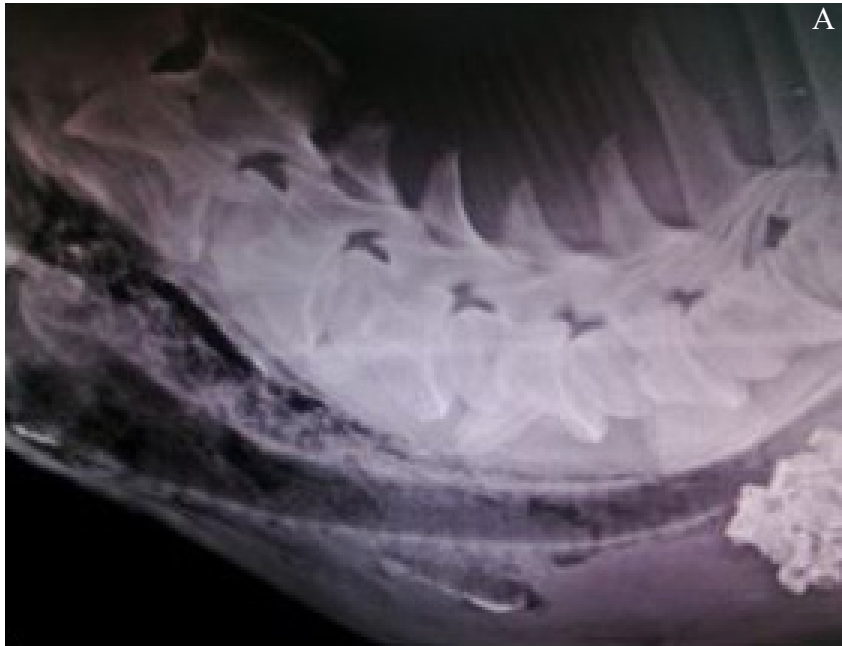


Figure 5. Oesophageal obstruction with rupture (A and B).

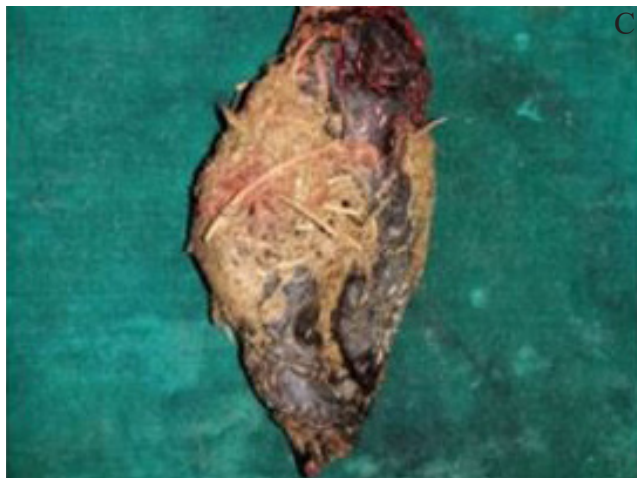
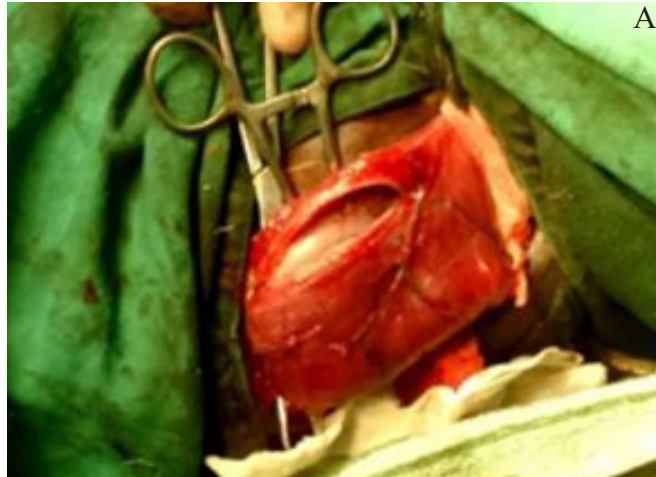


Figure 6. Oesophagotomy (A, B and C).

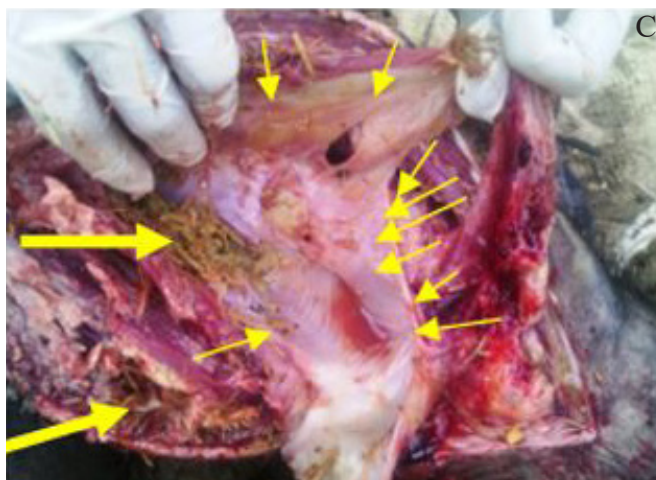


Figure 7. Complication (A, B and C).



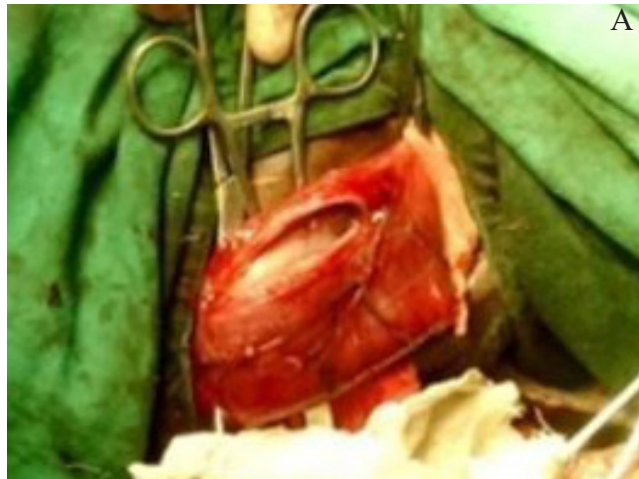


Figure 8. Clinical outcome (A, B and C).



the megaesophagus (Smith, 2009). Oesophageal diverticulum and oesophageal stricture cases were diagnosed by contrast radiography and treated by surgical techniques which were described by Singh *et al.* (2008) but prognosis in most of the cases was proved to be grave except on case of diverticulum. Intact mucosa protrusion through the rupture of muscle fibres initiate the diverticulum formation which increases continuously along with subsequent deglutition reflexes and starts accumulating the feed (Singh *et al.*, 2008). Megaesophagus, oesophageal diverticulum and stricture of oesophagus are associated with the morphological and functional disturbances which results in recurring obstruction and grave prognosis (Feige *et al.*, 2000).

Extensive swelling, infection, spillage of feed in the tissue and necrosis were observed in presented cases of oesophageal rupture. Mucosa was severely damaged, and wound was difficult to repair, which could not give the successful outcome. Rupture of oesophageal wall is responsible for extensive swelling and spillage of feed and infection which make it difficult to heal (Patil *et al.*, 2017). Factors responsible for the high rate of complications associated with oesophageal surgery include the lack of a serosal layer, movement during deglutition and reverse peristalsis, and an easily interrupted segmental blood supply (Haven, 1990). Aspiratory pneumonia is the common complication associated with the chronic cases of the oesohagus (Feige *et al.*, 2000; Singh *et al.*, 2021). Successful outcome in present study was only 37.5% of overall affections and in obstruction cases it was 60% which stresses the fact that in early diagnosis, mucosa remains intact and favours the successful outcome which is observed in present study.

## CONCLUSION

Oesophageal obstruction is the most common type of affections and other affections are in consequence of obstruction; probability of successful outcome of treatment is anticipated on the early diagnosis and healthy mucosal condition. The chronicity of these affections precedes the complications and poor prognosis.

## REFERENCES

- Amin, G.J. and S. Hashamiasl. 2015. Megaesophagus in the upper cervical oesophagus in a steer: A case report. *Vet. Med.-Czech*, **60**(1): 48-57. DOI: 10.17221/7925-VETMED
- Blikslager, A.T. and S.L. Jones. 2009. Disorders of the esophagus. In Smith, B.P. (edn.) *Large Animal Internal Medicine*, 4<sup>th</sup> ed. Mosby-Elsevier, St. Louis, USA. p. 688-692.
- Braun, U., R. Steiger, M. Fluckiger, G. Bearth and F. Guscelli. 1990. Regurgitation due to megaesophagus in a ram. *Canadian Vet. J.*, **31**(5): 391-392. Available on: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC1480719/pdf/canvetj00078-0069.pdf>
- Criag, D.R., D.R. Shivy, R.L. Pankowski and H.N. Erb. 1989. Esophageal disorders in 61 horses. Results of nonsurgical and surgical management. *Vet. Surg.*, **18**(6): 432-438. DOI: 10.1111/j.1532-950x.1990.tb01120.x
- Feige, K., C. Schwarzwald, A. Furst and B. Kaser-Hotz. 2000. Esophageal obstruction in horses: A retrospective study of 34 cases. *Canadian Vet. J.*, **41**(3): 207-210.
- Gangwar, A.K., K.S. Devi, A.K. Singh, N. Yadav, N. Katiyar, S.S. Kale, G. Patel and H.

- Singh. 2013. Surgical management of choke by a tricho-phyto bezoar in a crossbred cow. *Journal of Veterinary Advances*, **3**(3): 135-38. DOI: 10.5455/jva.20130322070547
- Hari Krishna, N.V.V., V.D. Prasad, G. SriHaritha and M. Sreenu. 2020. Cervical oesophageal obstruction in a she-buffalo. *Buffalo Bull.*, **39**(4): 501-505. Available on: <https://kuojs.lib.ku.ac.th/index.php/BufBu/article/view/777>
- Haven, M.L. 1990. Bovine esophageal surgery. *Vet. Clin. N. Am. Food. A.*, **6**(2): 359-369. DOI: 10.1016/s0749-0720(15)30866-5
- Jadhao, P.T., G.U. Yadav, A.U. Bhikane, N.M. Markandeya and Y.T. Desmukh. 2002. Choke due to dilatation of oesophagus in a calf. *Indian Vet. J.*, **79**: 1294-1296.
- Jhirwal, S.K., S. Singh and M. Lal. 2016. Surgical Management of oesophageal diverticulum in a hieffer buffalo. *Intas Polivet*, **17**(2): 651-652.
- Kumar, R.V.S., N.D. Lakshmi, P. Veena, P. Sankar and P. Yasotha. 2010. Surgical management of cervical esophageal obstruction in a buffalo: A case report. *Buffalo Bull.*, **29**(2): 71-72. Available on: [https://kukrdb.lib.ku.ac.th/journal/BuffaloBulletin/search\\_detail/result/286264](https://kukrdb.lib.ku.ac.th/journal/BuffaloBulletin/search_detail/result/286264)
- Kumar, V., J.V. Vadalia, A.M. Patel, A. Prasad, S.H. Talekar and P.B. Patel. 2016. Ultrasonographic, radiographic diagnosis and management of oesophageal obstruction in Jaffarabadi buffaloes and gir cattle. *Buffalo Bull.*, **35**(4): 549-556. Available on: [https://kukrdb.lib.ku.ac.th/journal/BuffaloBulletin/search\\_detail/result/358208](https://kukrdb.lib.ku.ac.th/journal/BuffaloBulletin/search_detail/result/358208)
- Madhava, R.T., S. Bharti and K.B.P. Raghavender. 2009. Oesophageal obstruction in a buffalo-A case report. *Intas Polivet*, **10**: 1-3.
- Mahesh, V. and L. Ranganath. 2016. Surgical management of esophageal fistula in two cows. *Intas Polivet*, **17**(2): 615-616.
- Manjunatha, D.R., M. RaoCh, P. Veena and G. Vani. 2018. Non invasive retrieval of esophageal obstruction-A report of ten cattle. *Intas Polivet*, **19**(1): 52-54.
- Marzok, M., A. Moustafa, S. EL-Khodery and K. Muller. 2015. Esophageal obstruction in water buffalo (*Bubalus bubalis*): A retrospective study of 44 cases (2006-2013). *Turk. J. Vet. Anim. Sci.*, **39**(2): 233-240. DOI: 10.3906/vet-1410-4
- Patil, A.S., V. Balaganur, V. Chauhan, B.N. Nagaraj and L. Ranganath. 2017. Retrospective studies on occurrence and surgical management of esophageal obstruction in bovines. *Intas Polivet*, **18**(2): 286-292.
- Radostits, O.M., C.C. Gay and D.C. Blood. 2000. Oesophageal obstruction. In Radostits, O.M., C.C. Gay, K.W. Hinchcliff, P.D. Constable (eds). *Veterinary Medicine - A Textbook of the Diseases of Cattle, Sheep, Pigs, Goats and Horses*, W.B. Saunders Ltd., London, UK. p. 1526-1527.
- Sasikala, K., G. Vijayakumar and G.A. Balasubramaniam. 2018. Endoscopic diagnosis of congenital megaesophagus - A study of six buffalo calves. *Intas Polivet*, **19**(1): 50-51.
- Shivprakash, B.V. 2003. Pregnancy and young age: prone factor for oesophageal obstruction in buffaloes. *Intas Polivet*, **4**(20): 284-285.
- Singh, S., S. Palecha and P. Bishnoi. 2016. Surgical retrieval of para-esophageal penetrating foreign body in cow. *Intas Polivet*, **17**(2): 605-606.
- Singh, S., P. Bishnoi, S. Palecha, R. Singh and M.

- Lal. 2017. Penetrating oesophageal foreign bodies in three buffaloes. *Indian J. Vet. Surg.*, **38**(2): 139.
- Singh, S., S. Palecha, P. Bishnoi and T.K. Gahlot. 2021. Oesophageal obstruction in dromedary camels: Report of 4 cases. *J. Camel Pract. Res.*, **28**(2): 197-200. Available on: <https://camelsandcamelids.com/uploads/journal-manuscript/PG%20197-200%20Oesophageal%20obstruction%20in%20dromedary.pdf>
- Singh, P., D.K. Sharma, S.M. Behl, T.K. Gahlot and I.S. Candana. 1991. Surgical management of oesophageal anomalies in buffaloes. *Indian Vet. J.*, **68**: 875-878.
- Singh, A.P. and P. Singh. 1999. Oesophageal radiography in cattle and buffaloes. *Indian Journal of Veterinary Surgery*, **20**(2): 65-69.
- Singh, J., A.P. Singh and D.B. Patil. 2008. The Digestive System, In Tyagi, R.P.S and J. Singh (eds.) *Ruminant Surgery*. CBS Publishers and Distributors, New Delhi, India. p. 183-223.
- Smith, B.P. 2009. Esophageal dilation (megaesophagus) and hiatal hernia. In Smith, B.P. (edn.) *Large Animal Internal Medicine*, 4<sup>th</sup> ed. Mosby-Elsevier, St. Louis, USA. 805p.
- Yadav, G.U., M.G. Thorat, A.G. Somwamshi and M.J. Talekar. 2008. Thoracic oesophageal obstruction in a Marathwadi buffalo. *Vet. World*, **1**: 149. Available on: <https://www.veterinaryworld.org/2008/May/Thoracic%20Oesophageal%20obstruction%20in%20a.pdf>