The Libyan Journal of Agriculture: volume 8, 1979

The Effect of Carbachol in Stomach and Oesophagial Motility in Sheep

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ABSTRACT

The effect of carbachol on the motility of the rumen, reticulum and oesophagus in sheep was investigated. The main responses recorded were those of complete inhibition of the reticular motility, reduction in amplitude of the primary and secondary ruminal contractions and increased activity of the oesophagus.

INTRODUCTION

Textbooks of Veterinary Pharmacology differ in their description of the effects of carbaminoylcholine chloride (Carbachol) on the forestomach, perhaps because there are also conflicting reports on this matter in the literature. Quinn and Van der Wath (6) and Duncan (5) reported that Carbachol increases the motility of the forestomach while Dougherty (4) found that it depressed ruminal movements. Stowe (7) stated that it increased the rate and amplitude of the rumino-reticular contractions while Alexander (1) reported that Carbachol increased the amplitude of the reticular contractions, but not the frequency, and that this increase was followed by a period of inhibition.

The present work throws some more light on the effect of Carbachol on the motility of the forestomach and the oesophagus in sheep.

MATERIALS AND METHODS

Series of relevant experiments were carried out on three sheep; pressure changes were recorded from the oesophagus, by a train of 2/4 lightly inflated, non-elastic balloons introduced via a rumen fistula and connected to strain-guage pressure transducers via a rumen fistula (Ali and Singleton, 1). Similar non-elastic balloons were used for recording the pressure changes in the reticulum and rumen (Ali, Nicholson and Singleton 3).

Carbachol was either administered intravenously via a previously implanted polythene cannula or intramuscularly and subcutaneously using fine needles.

RESULTS AND DISCUSSION

The oesophagus showed a marked increase in swallowing activity due to a copious increase in the secretion of saliva (Fig. 1). The tracing from the thoracic oesophagus

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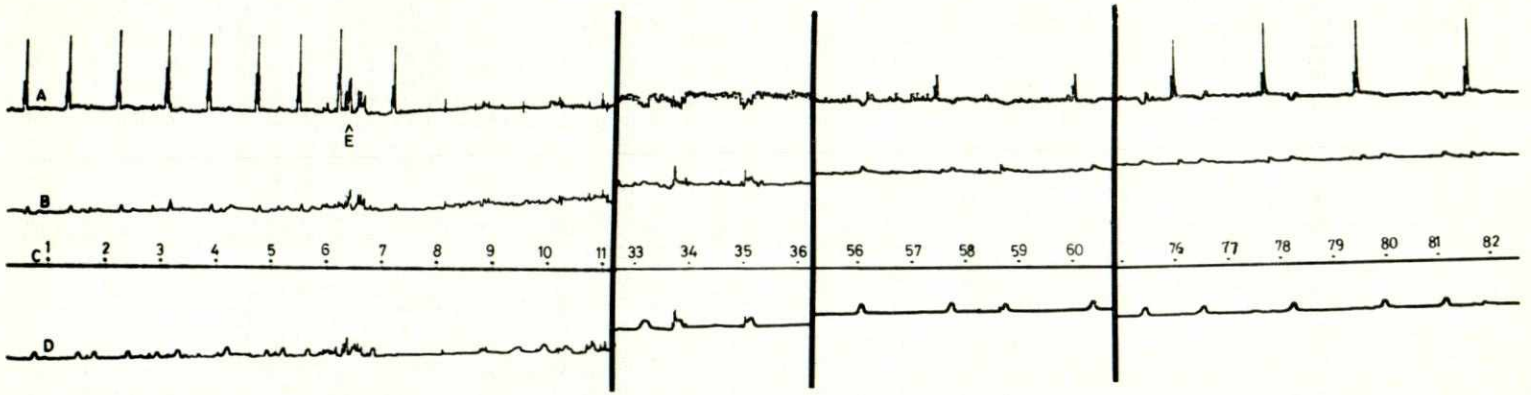

Fig. 1 A. Reticulum, B. Rumen Dorsal Sac, C. Time in minutes, D. Rumen Ventral Sac, E. Intramuscular Injection of 0.014 mg/kg. The tracing showing the rise in the tone of the dorsal and ventral sac of the rumen, inhibition of retuculum contractions for about an hour and their gradual return at a reduced frequency.

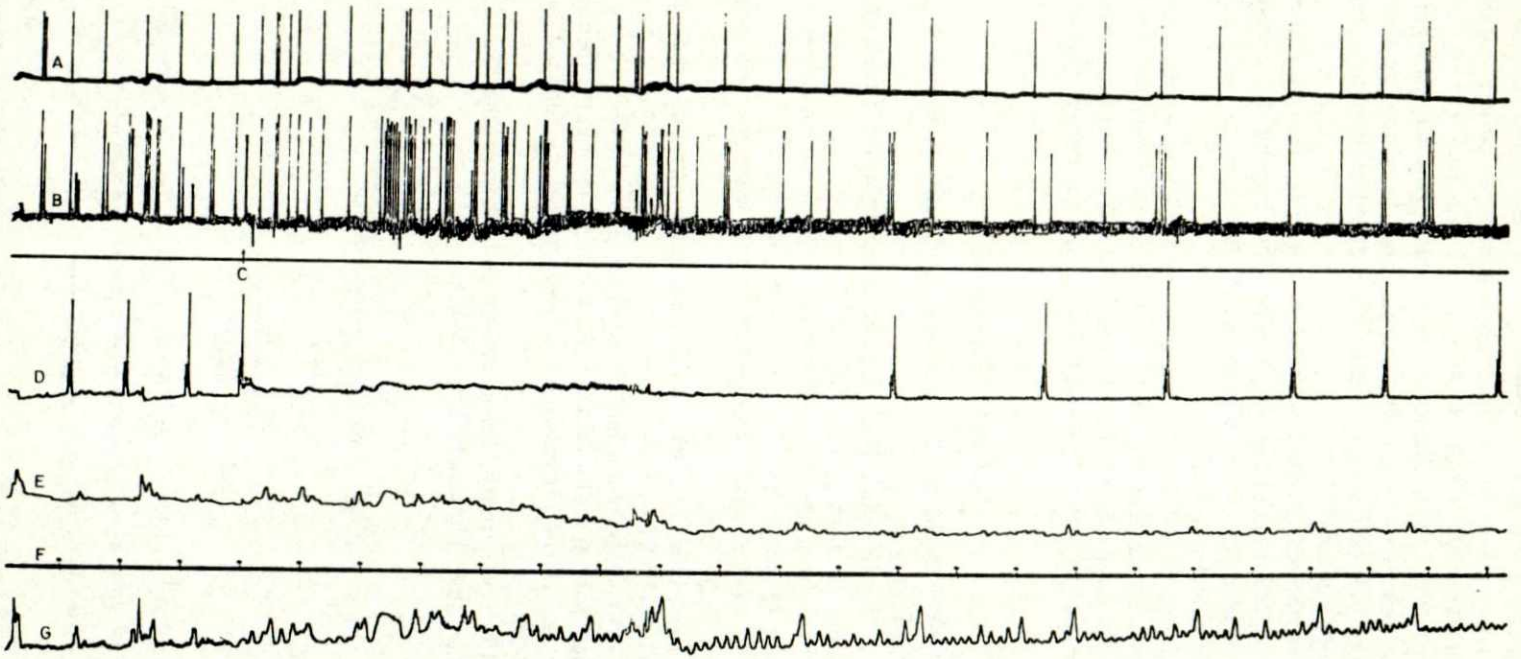

Fig. 2. A Cervical oesophagus. B. Thoracic oesophagus, C.I.V. Injection of 0.003 mg/kg. D. Reticulum. E. Rumen Dorsal Sac. F. Time in minutes. G. Rumen Ventral Sac. Shows the rhythmic contraction in ventral sac, the immediate stoppage of the reticulum contraction for about 12 minutes and return at reduced frequency.

also indicated that both the rate and the depth of respiration had increased. The biphasic reticular contractions were completely inhibited for periods varying from 10 minutes to an hour dependent on the dosages that varied from 0.05 mg to 0.5 mg for adult sheep. After recovery, the frequency of the reticular contractions was reduced but the amplitude was increased (Fig. 2). The primary and the secondary contractions of the rumen continued but the pressure change was reduced in amplitude and the basal tone showed a progressive rise.

Occasionally, a rhythmic pattern of pressure change, in the ventral sac of the rumen, was observed, with a frequency of 5–6/min. It is possible that this was transmitted from the abomasum. The changes in the ruminal activity persisted for sometime after the reticular contractions had returned.

Increased defecations of soft faeces occurred in about 2 hours after injection.

It is well known that carbachol is intensively used in Veterinary Medicine as a hypodermic purge for large animals, but the results of the present experiments indicate that it may also be used fo removing foreign bodies from the oesophagus of ruminants.

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تأثير الكاربكول على حركة المعدة والمرئ في الأغنام

طالب على

المستخلص

إن مادة (الكاربكول) لها استعمالات كثيرة في العلاج البيطرى ، وبما أن الآراء تتضارب في كتب ومجلات الاقربازين حول تأثير هذه المادة على حركة المعدة في الحيوانات المجترة الزراعية ، لذا أجرى هذا البحث ، وقد ثبت أن هذه المادة توقف تماما حركة المعدة الأولى (الشبكية) وتقلل من نشاط المعدة الثانية (الكرش) وله تأثير واضح على تنشيط حركة المرىء .

لذا نصح بإعطائه للحيوانات المجترة التي تشكومن انسداد المرىء بالقطع الغذائية الكبيرة .