<table>
<thead>
<tr>
<th>Serial No</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Author 1</strong></td>
<td>UDEGBUNAM, S.O</td>
</tr>
<tr>
<td><strong>Author 2</strong></td>
<td>KENE, R.O.C</td>
</tr>
<tr>
<td><strong>Author 3</strong></td>
<td>NNAJI, T.O</td>
</tr>
<tr>
<td><strong>Title</strong></td>
<td>Evaluation of Haematological Changes, Small Intestinal Stenosis and Adhesion Using Two Anastomosis Techniques in Dogs</td>
</tr>
<tr>
<td><strong>Keywords</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Description</strong></td>
<td>Evaluation of Haematological Changes, Small Intestinal Stenosis and Adhesion Using Two Anastomosis Techniques in Dogs</td>
</tr>
<tr>
<td><strong>Category</strong></td>
<td>Veterinary Medicine</td>
</tr>
<tr>
<td><strong>Publisher</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Publication Date</strong></td>
<td>2005</td>
</tr>
</tbody>
</table>
| **Signature** | Digitally signed by Vincent Ekwelem
DN: CN = Vincent Ekwelem, C = US, O = University of Nigeria, OU = University Library
Reason: I have reviewed this document
Date: 2008.10.16 22:51:05 +02'00' |
EVALUATION OF HAEMATOLOGICAL CHANGES, SMALL INTESTINAL STENOSIS AND ADHESION USING TWO ANASTOMOSIS TECHNIQUES IN DOGS

Udegunam, S.O., Kene, R.O.C. and Nnaji, T.O.
Department of Veterinary Surgery, University of Nigeria, Nsukka

Summary
End-to-end inverting and everting suturing techniques for anastomosis of the small intestine (duodenum) were compared in 16 local dogs. Specifically the occurrence of adhesion and stenosis, haematologic changes and radiographic findings following anastomosis were compared. The results clearly demonstrated that eversion technique led to narrowing of the intestinal lumen (stenosis). Omental and intestinal tissue adhesion was observed to be greater with eversion technique than with inversion technique. The packed cell volume (PCV) and mean haemoglobin (Hb) values of the two groups showed initial fall below the preoperative values by the second post-operative day, while total leukocyte counts of the two groups increased by the second day post-operation, decreasing on days 7 and 14 post-operation in both groups. There was neutrophilia and lymphopaenia on the second day post-operation which decreased subsequently on days 7 and 14 post-operation. No significant differences between comparable means in the same row (p>0.05) were noted when the haematology results obtained in both groups were statistically analysed. It was concluded that use of end-to-end inversion suture technique resulted in less stenosis and few omental adhesions compared with the eversion technique. Thus end-to-end inverting technique is a preferred pattern of choice and should be adopted by veterinary surgeons.
INTRODUCTION

Intestinal resection and anastomosis are associated with many problems (Benneth et al., 1970). Commonly encountered problems are stenosis and leakage. Bennett and Zydeck (1970). Correction of these problems is mostly by surgery (Archibald, 1974). The modern surgical techniques for closure of intestinal wounds are suturing patterns, mechanical stapling devices and tissue adhesives (Gaset and Kopf, 1964). Evaluation of the above techniques have shown no advantage of other techniques various tissue adhesives and mechanical stapling devices have failed to demonstrate an advantage over suture pattern (Matsumoto et al., 1967). The four main types of suturing end-to-end intestinal anastomosis in dogs and cats are the inverting, everting, invaginating and approximating suture patterns (Archibald, 1974). Performance of any technique is assessed by absence of leakage, less adhesion and rate of healing. In considering these criteria, Archibald (1974) observed that a single layer, inversion is most reliable. Bennett and Zydeck (1970) recorded greatest decrease in luminal diameter with the evertting pattern, While Buyers and Meier (1968) and Lighton (1967) reported decrease in intestinal luminal diameter following the use of inversion technique, thus the development of eversion technique. In the light of different reports in intra-luminal diameter reduction, a comparative work was carried out using inverted and everted suture patterns.

MATERIALS AND METHODS

Animals

Sixteen mongrels weighing between 3.0-7.0 kg were used in this study. Experimental procedures

The dogs were starved of food for 24 hours while water was made available up to the time of surgery as described by Bennett and Zydeck (1970). 0.025 mg/kg of atropine sulphate and 1mg/kg xylazine per dog were given as premedicant. 10 mg/kg of pentobarbitone sodium was given as anaesthetic. A laparotomy incision as described by Bennett and Zydeck (1970) was done. A loop of duodenum was brought out of the incision and the artery and vein double ligated with size 3-0 catgut. The intestinal contents were digitally massaged from the surgical site and camall intestinal forces were placed 4 cm cranial and caudal to the site of anastomosis. The intestine was transected and the two ends anastomosed using standard end-to-end technique (Markowitz, 1964). The suture material for anastomosis was size 3-0 chromic catgut. The suture patterns used were of two types.

Group I: Inverting suture pattern as described by (Bennett and Zydeck, 1970).

Group II: Everting suture pattern as described by (Bennett and Zydeck, 1970).

Each point of anastomosis was marked with an intramuual suture. To accurately identify the site: Closing of the Incision:

The laparotomy incision was closed as described by Bennett and Zydeck (1970)

Post surgical care: Consisted of administration of Procaine penicillin (10,000 i.u/kg intramuscularly (i.m)) and streptomycin (10mg/kg i.m) post surgically for 5 days. The dogs were fasted for 24 hours while water was given following recovery from anaesthesia.

Haematology: On the 2nd, 7th, 14th and 16th day post surgery blood was collected from each dog for haematological study, which include the PCV, Hb concentration, TWRC and DWBC. The data collected were compared statistically using student t-test. P<0.05 were considered significant.

Post mortem examination. This was done as described by Bennett and Zydeck (1970) which includes euthanizing the dogs with 60mg/kg pentobarbitone sodium given intravenously. Then the anastomosed duodenum was removed and observed for adhesion. As well the anastomosed duodenum was filled with barium sulphate suspension and the cut ends tied of and x-rayed to check for stenosis.

RESULTS/ DISCUSSION

Haematologic changes

The PCV, the mean Hb concentration and percentage lymphocytes (%L) of the two groups (Group I and II) showed initial fall below the preoperative values by the 2nd postoperative day and subsequent increase above the preoperative values. These were in consonance with the report of Schalm et al. (1975) which says that acute blood loss results in normocytic normochromic anaemia with subsequent erythropoiesis and haemodilution. The total leucocyte count (TLC) and the percentage neutrophils (%N) of the two groups which increased by the 2nd day post operation and decreased by the 7th and 14th post operative days may be as a result of stress of surgery and body reactions to acute inflammatory changes. This also agrees with the findings of Schalm et al. (1975) who documented that stress results into leucocytosis. (See the table below)

<table>
<thead>
<tr>
<th>Exp. Period (days)</th>
<th>PCV</th>
<th>Hb</th>
<th>TLC</th>
<th>%N</th>
<th>%L</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Gl</td>
<td>GII</td>
<td>Gl</td>
<td>GII</td>
<td>Gl</td>
</tr>
<tr>
<td>-1</td>
<td>39.13±</td>
<td>41.00±</td>
<td>12.96±</td>
<td>13.60±</td>
<td>14.34±</td>
</tr>
<tr>
<td></td>
<td>1.73</td>
<td>3.30</td>
<td>0.65</td>
<td>1.62</td>
<td>4.85</td>
</tr>
<tr>
<td>+2</td>
<td>38.00±</td>
<td>40.00±</td>
<td>12.21±</td>
<td>12.70±</td>
<td>15.59±</td>
</tr>
<tr>
<td></td>
<td>1.60</td>
<td>3.30</td>
<td>0.48</td>
<td>1.81</td>
<td>5.27</td>
</tr>
</tbody>
</table>
Surgery was performed on day 0 of the experimental period. There were no significant differences between comparable means in the same row (P>0.05).

Post Mortem Findings (PM)

The PM examination revealed adhesion of intestine and the omentum to the surrounding abdominal organs, which was more severe in Group II dogs than in Group I dogs (Fig 1). This is in consonance with the report of Johnson et al. (1983) which says that the increase in the adhesion is a consequence of mucosal eversion leading to delay in the healing process, excessive inflammation and consequent adhesion of intestine to the omentum and the surrounding abdominal organs. Radiography Findings. Contrast radiography using barium sulphate suspension demonstrated that the eversion technique resulted in greater narrowing of the intestinal lumen than the inversion technique (Fig 2).

CONCLUSION

In conclusion the work has shown that inversion technique characterised by less stenosis and few adhesion is a better suture technique than the eversion technique.

References

THE OSTEOMEDULLOGRAPHIC EVALUATION OF TIBIAL FRACTURES IMMOBILIZED WITH DIFFERENT FIXATORS

Nnaji, T.O., Kene, R.O.C. and Udegbunam, S.O.
Department of Veterinary Surgery, University of Nigeria, Nsukka.

Summary
This study was carried out to evaluate the osteosynthesis of tibia fractures immobilized with intramedullary (i.m.) pin and plaster of Paris (POP) by osteomedullography. A total of 12 mongrel dogs were used after their acclimatization to the environment. They were grouped into A, B, C of four dogs each. Each group of dogs was subjected to one method of immobilization after fracture reduction. Group A dogs were immobilized with i.m. pin; group B with POP and group C were left unimmobilized after the reduction. These dogs were monitored and evaluated clinically and osteomedullographically to ascertain the performance of each group in terms of the time of restoration of intraosseous venous circulation to the fragments, the period of attainment of radiographic union as well as the functional performance of the limbs. In each case osteomedullography was considered positive when the contrast medium (Urographin®) crossed the fracture and became visible in the proximal fragment. In negative osteomedullography, all contrast medium remained in the distal fragment. The results showed a more extensive, smooth and orderly flow of contrast medium across the fracture gap of 75% of the i.m. pin group compared to 25% and 0% seen in pop and control groups respectively at day 54 postoperatively. At week eight all the dogs in the i.m. pin group had attained radiographic union unlike the 25% attainment seen in both the pop and control groups. One dog each attained radiographic union at approximately 5 and 10 weeks for the pop and control groups, respectively. The i.m. pin group demonstrated a better stabilization of the fractured fragments, earlier intramedullary vascular connections, low level of post-surgical complications and better performance in functional limb usage (p<0.01) as compared to pop and the control groups. However, i.m. pinning also had its own shortcomings such as inability to counteract rotational, distractive and compressive forces acting on the fractures.

INTRODUCTION
Extensive range of techniques has been used in management of fractures for many centuries. Once the fracture has been reduced and provided the blood supply to the fragments is intact, the main requirement for successful healing is adequate immobilization. Rigid immobilization can be achieved by external and internal fixation, but both methods are not without their individual shortcomings. The repair of bone and the evaluation of bone healing has been a subject of major interest and controversy. Microradiographic and fluorescent microscopic studies of bone healing have been performed (Rheinlander et al, 1968). Biological osteosynthesis has also been described (Aron et al, 1995; Hulse et al, 2000). Osteomedullography with phlebopression of the extrarotssous soft tissue veins has also been indicated as a reliable technique in evaluating bone healing especially in cases where clinical and plain radiographic criteria might prove inadequate. This work is therefore aimed at evaluating the osteosynthesis of tibial fractures immobilized with different fixators by osteomedullography.

MATERIALS AND METHODS
A total of twelve mongrel dogs were used after their acclimatization to the environment. They were grouped into A, B, C. A transverse osteotomy was created on the shaft of the tibia of each dog under general anaesthesia. They were reduced and immobilized as follows: Group A: Intramedullary pin (i.m. pin), Group B: Plaster of Paris (POP) and Group C: Unimmobilized. Osteomedullography was carried out in series weekly after phlebopression of the extrarotssous blood vessels for a period of 10 weeks postoperatively. The result was considered positive if the contrast medium crossed the fracture, being visible in the proximal fragment. In negative result all contrast medium remained in the distal fragment. The time of re-establishment of the venous flow to the proximal fragment was an index of the healing process. The functional limb usage of each animal in each group was also evaluated and recorded.

Generally P₁, P₂, P₃, P₄ represented the animal numbers 1, 2, 3, 4 in the i.m. pin group while O₁, O₂, O₃, O are and C₁, C₂, C₃, C₄ are for animal numbers 1, 2, 3, 4 in pop and control groups respectively.