

**Short Communication**

**COMPLICATIONS FROM STUDENTS' SMALL ANIMAL  
SURGICAL LABORATORIES**

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**SUMMARY**

Three hundred and seventy four (374) post surgical complications were recorded in a retrospective study of operations carried out during the student's small animal surgical laboratories Zaria between 1990 and 1993. Wound dehiscence (28.1%), wound infection (24%), and haemorrhage (13.9%) were the commonest complications observed. Other complications include death, oedema, peritonitis, aural asymmetry, evisceration, intestinal obstruction, herniation, perivascular sloughing, moist dermatitis, intramedullary pin (IM) migration, self-mutilation, adhesions, myositis and ankylosis. Correction of skin defects, caudectomy and castration resulted in higher number of complications. Interviews of instructors of the surgical laboratories, conducted through questionnaires revealed that the use of stray dogs with poor nutritional and health status, septic surgical procedures, poor use of surgical instrument and seldom cleaned/disinfected kennels were some of the factors that led to high incidence of complications. Management of complications entailed the use of systemic antibiotics, treatment of surgical site as an open wound or in some cases reconstructive surgery. Recommendations are made on how to avert occurrence of post surgical complications from students' small animal surgical laboratories.

**KEYWORDS:** Surgical complications, student practical, dogs

**INTRODUCTION**

The cost of running small animal students' experimental surgical class in the Department of Veterinary Surgery and Medicine, F.V.M., A.B.U., Zaria is estimated at ₦150,000.00 per annum, thus it is an expensive venture. A major factor contributing to this, apart from the cost of animals and surgical materials, is the cost of managing post-surgical complications. Despite the many difficulties involved, this experimental surgery must be undertaken because practical surgery is a major course in the undergraduate veterinary curriculum.

As an art and science, surgery presumes a basic knowledge of anatomy, physiology and pathology on the part of the

practitioner upon which an accumulation of skill and experience is built.

Experience, repetition and practice under a variety of circumstances are essential. Thus the student who encountered the difficult phases of experimental surgery on animals may better profit by his experience in practice after graduation. The purpose of this study is to highlight these difficulties in terms of post surgical complication, the possible causes and remedies or ways of minimizing the complications.

**MATERIALS AND METHODS**

Records of surgical complication resulting from small animal experimental surgical

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procedures and their management in dogs used by the 5<sup>th</sup> year Veterinary students in the Department of Veterinary Surgery and Medicine, F.V.M., A.B.U., Zaria from 1990 to 1993 were studied.

The surgical procedures carried out were; correction of skin defects, caudectomy, castration, enucleation, gastrotomy, ovariohysterectomy, ear cropping, orthopaedic surgery, enterotomy, intestinal resection and anastomosis, nephrotomy, nephrectomy and limb amputation (Table 1). The students are divided into groups consisting of 4–8 students and each group performs the experimental surgery on prearranged schedule. Each student group conducted each surgical procedure once every year.

A questionnaire consisting of 10 items were prepared, copies were distributed to the

seven supervisors of the surgical laboratories. Part one of the questionnaire requested information on the personal data of the respondent such as sex, teaching experience in surgery and rank. The second part was a group of questions to assess students' attitude towards their experimental animals, operating room conduct, ratio of students to dog, the nutritional/health status of dogs used, post surgical complications observed, the causes and management.

### RESULTS

Post-surgical complications from students' experimental surgical laboratories are presented in Tables II and III. Wound dehiscence (28.1%), wound infection (24.3%) and haemorrhage (13.9%) were the most prevalent. Isolates from wound infection are *Staphylococcus* and *Streptococcus* spp.

**TABLE I: Types and number of surgical procedure performed on dogs by 5<sup>th</sup> year students at Faculty of Veterinary Medicine, Ahmadu Bello University, Zaria from 1990 – 1993**

Surgical Procedure	Number of Procedures performed/year				
	1990	1991	1992	1993	Total
Correction of skin defect	9	13	13	7	42
Caudectomy	9	13	13	7	42
Castration	9	13	13	7	42
Enucleation	9	13	13	7	42
Gastrotomy	9	13	13	7	42
Ovariohysterectomy	9	13	13	7	42
Ear cropping	9	13	13	7	42
Orthopaedic (closed reduction)	9	13	13	7	42
Enterotomy	9	13	13	7	42
Intestinal resection and anastomosis	9	11	13	7	40
Nephrotomy	7	11	12	7	37
Nephrectomy	6	11	12	6	35
Orthopaedic (open reduction)	6	11	12	6	35
Limb amputation	6	10	11	5	32
Total	115	171	177	94	557

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**TABLE II: Number of post surgical complications observed in dogs used for surgical exercises by 5<sup>th</sup> year students (1991 – 1993)**

<b>Surgical complication</b>	<b>No. (%) occurrence</b>
Wound dehiscence	105 (28.1)
Wound Infection	91 (24.3)
Haemorrhage	52 (13.9)
Death	28 (7.5)
Oedema	20 (5.4)
Peritonitis	16 (4.3)
Aural asymmetry	12 (3.2)
Evisceration	10 (2.7)
Intestinal obstruction	8 (2.1)
Herniation	6 (1.6)
Perivascular sloughing	6 (1.6)
Moist dermatitis	6 (1.6)
IM pin migration	4 (1.1)
Self mutilation	3 (0.8)
Adhesion of intestinal organs	3 (0.8)
Myositis	2 (0.5)
Ankylosis	2 (0.5)
<b>Total</b>	<b>374 (100)</b>

Correction of skin defects (V, Y, Z – plasty) (16.9%), caudectomy (12.0%) and castration (9.9%) resulted in more complications. Adhesions of internal organs were diagnosed following a second surgical operation.

Wound dehiscence and infection were often managed by debridement and lavage with sterile isotonic solutions in some cases with the addition of chlorhexidine or 1% povidone-iodine. Bandages were sometimes applied to protect the wounds from

additional heavy contamination, licking and chewing by the animal.

Where there was extensive self-mutilation and evisceration, reconstruction surgery was employed with heavy doses of systemic antibiotics. A second laparotomy and herniorraphy were performed to manage post-surgical intestinal obstruction and herniation respectively. Cases of oedema were managed by administration of diuretics such as frusemide (Lasix).

All the questionnaires sent out were returned and found usable. Six (85.7%) respondents are males and one (14.3%) female. Three of the respondents are senior lecturers and a professor with more than 12 years of experience, while four are from the rank of assistant lecturer to lecturer II with 2 to 10 years of experience.

Respondents ranked wound dehiscence, wound infection, oedema and haemorrhage as the major post surgical complications. They were of the opinion that complications were due to the use of stray dogs with poor nutritional/health status, septic surgical technique, poor use of surgical instrument, poor operating room conduct, high ratio of students to dog and dirty kennels.

TABLE III: Number of post surgical complications observed in procedures performed on dogs by 5<sup>th</sup> year students (1991 – 1993)

Surgical procedure	Number of operation	Number of complications	Percentage occurrence
Correction of skin defects	42	62	16.6
Caudectomy	42	45	12.0
Castration	42	37	9.9
Enucleation	42	32	8.6
Gastrotomy	42	29	7.8
Ovariohysterectomy	42	28	7.5
Ear cropping	42	25	6.7
Orthopedic (closed reduction)	42	24	6.4
Enterotomy	42	22	5.9
Intestinal resection and anastomosis	40	21	5.6
Nephrotomy	37	17	4.5
Nephrectomy	35	11	2.9
Orthopedic (open reduction)	35	11	2.9
Limb amputation	32	10	2.7
Total	557	374	100

### DISCUSSION

The high incidence of wound dehiscence observed in this study may be attributed to improper closure of surgical wounds, unnecessary trauma to tissues for example wrong application of instrument to tissues, excision of large portions of tissue during surgery, and poor nutritional/health status of the experimented dogs which consequently interfere with wound healing, as also observed by Adeyanju *et al.* (1992). Another contributing factor to the high incidence of wound breakdown and infection is the dogs habit of licking the wounds. Meyer *et al.* (1959) noted that the incidence of wound dehiscence occurs at the time of recovery from anaesthesia, 7-10 days post surgically or within one month of surgery due to vigorous exercise. Its occurrence at recovery is due to struggling and 7 – 10 days post surgery is associated with surgical misjudgement (Dingwall, 1971); Winstanley, 1975) as observed in this study. Surgical misjudgement includes the use of wrong suture material; failure to provide adequate drainage, inadequate pre-

operative preparation, and use of grossly undernourished patient and closure of wound under excessive tension.

Bacterial contaminations from septic procedure during surgery or from dirty kennels post surgery are causative factors of wound infection (Lee *et al.*, 1988; Swaim, 1990) and peritonitis (Smith and Thomas, 1972). *Staphylococcus* and *Streptococcus* organisms were the main isolates from cases of wound infection as observed by Zeitter (1967). The high incident of wound infection recorded is due to failure of students to notify supervisors when asepsis is broken during surgery and contamination of wounds from dirty kennels post surgery. Student "surgeons" are sometimes caught moving from on surgical table to the other to borrow surgical instruments.

Inadequate haemostasis and sepsis are the causes of post-surgical haemorrhage in students' experimental surgery. Other factors that have been reported are coagulation defect and rise in blood

pressure (Burnett, 1981). It was observed in this study that most of the complications were recorded in the correction of skin defect probably because this procedure is usually the first laboratory and students are nervous and unsure. The complications observed with castration and caudectomy may be attributed to the dogs' sitting and licking habits. Sitting results in bruising and irritation of the surgical site. This in turn makes the dog to lick and chew on the site, thus leading to contamination and wound dehiscence.

The irrigation of septic surgical wounds with antiseptics such as chlorhexidine, and povidone-iodine has been beneficial as reported by Amber, *et al.* (1983). However, preoperative administration of antibiotics will give protection against colonization of microbes, intra-operative administration will ensure adequate tissue levels throughout critical period while postoperative antibiotic therapy will prevent post surgical sepsis (Furneau, *et al.*, 1977).

### CONCLUSION

Conducting students' experimental surgery on dogs is expensive, however this cost can be reduced by minimizing the added cost of managing post surgical complications. Close supervision of students and getting them acquainted with post surgical complications, their causes and how to prevent occurrence is essential.

### RECOMMENDATIONS

1. Healthy dogs must be obtained for student's experimental surgery, and dogs must be provided with adequate and nutritious food.

2. Ensure daily cleaning and disinfection of dogs kennels.
3. Ensure that students review surgical procedure and instrumentation prior to surgery. This could be effected by administering a pre-surgical quiz.
4. Strict supervision of students to ensure a sepsis, adequate technique, correct use of instruments, suture, and suture patterns/knots.
5. Maintain a ratio of 4-5 students per dog.
6. Ensure adequate number of supervisors for each surgical class.
7. Provide complete surgical pack for each surgical group of students.

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