

ANNUAL PROGRESS REPORT OF RESEARCH SCHEME

1. Project title : Incidence, Aetiology and Pathology of tumours of the Ethmoid in domestic animals.
2. Sanction No : F.1.(4)74-ASR(iv)dated 17-8-76 of the Assistant Director General.
3. Report period : 1-1-79 to 31-12-79
4. Date of start : 22-2-78
5. Date of termination : 21-2-81
6. a. Name of Institute : Colloge of Veterinary & Animal Sciences, Kerala Agricultural University.
- b. Division : Department of Pathology
- c. Location of work : Mannuthy

7. Technical personnels employed:

Sl.No.	Name	Designation	From	To
1.	Dr. A. Rajan, M.V.Sc, Ph.D.	Professor of Pathology (Project Officer)	3-6-78	
2.	Dr. S. Sulechana M.V.Sc, Ph.D.	Associate Professor (Virologist)	22-2-78	
3.	Dr. Enas Augustine, B.V.Sc	Research Fellow	18-1-79	21-7-79
4.	Dr. A. Jamaludeen B.V.Sc	Research Fellow	23-8-79	18-11-79 (Post vacant since 18-11-79)
5.	Sri. V.M. Jacob	Laboratory Technician	16-8-78	
6.	Sri. M. Gangadharan	Class IV employee working on daily wages.	15-3-78	

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8. Total outlay	:	2,08,936/-
9. Total amount spent in previous year	:	45,532.27
10. Total amount under report:	:	

Sanctioned for the year:

* Pay	:	44,100.00
DA	:	14,800.00
TA	:	1,500.00
C & O A	:	1,100.00
Recurring contingencies:	:	12,000.00
Non-recurring contingencies	:	-

		73,500.00
		=====

Spent during the year:

Pay and allowances	:	39,668.25
TA	:	808.05
Recurring contingencies:	:	13,921.78

Total	:	54,398.08
		=====

* The University budget is for the Financial Year and not for the calander year.

11. Objectives:

- To assess the incidence of tumour of the othmoid in domestic animals in Kerala.
- Investigate the aetiology of tumours of the othmoid.
- Study the epidemiological and pathological features of the neoplasms and the factors influencing the spread in herds.
- Find out whether any hereditary factors are involved in the initiation of this neoplastic process.
- In vitro culture of tumour cells and study their biological behaviour.
- Explore suitable preventive and curative measures.

12. Approved technical programme:

a. For the year under report:

1. Ailing animals will be purchased and subjected to detailed clinico-pathological studies.
2. Fresh material collected from suitable cases will be cultured in different media for bacteria and fungus.
3. Tumour tissue will be cultured in different tissue culture media and attempt will be made to propagate the cell line and study its biological behaviour.
4. Fresh tissue to be transplanted into homologous and heterologous hosts.
5. Nasal washings/swabs collected from animals in the age group of 3-6 years from farms endemic for tumours of the Ethmoid will be subjected to cytopathological studies.

b. For the Next year:

1. Nasal washings/swabs of animals in the susceptible age groups, in endemic areas/farms, will be subjected to detailed cytological studies.
2. Tumour cells will be cultured in different tissue culture media and attempts will be made to propagate the cell line.
3. Fresh tumour tissue to be implanted into homologous and heterologous hosts by different routes.
4. Cell free, bacteria free filtrate of the tumour tissue will be inoculated into chicken embryo and tissue culture system.
5. Electronmicroscopic studies on tumour tissue will be continued.
6. Anti-carcinogens used in medical practice will be tried on selected clinical cases of tumour.
7. Histopathological and histochemical studies on tumour tissue will be continued.

12. Progress of Research:1. Incidence

To gauge the incidence of the tumour during the year 1979, the heads of animals slaughtered at different slaughter houses in the state were examined for identifying cases of tumour. The total number of animals examined have been shown below.

Number of animals examined during 1979:

Cattle	: 25532
Buffaloes	4633
Goats	46546
Sheep	725

In all, during the year under report 83 cases of tumour were recorded. The details of the animals have been incorporated in table I and II (Table I and II - Appendix). Out of the 83 cases recorded 48 cases were subjected to detailed investigation.

1.1. Breed incidence:

The breed wise incidence of the tumour has been documented in table III. It was encountered in buffaloes (3), Bulls (4), cows and bullocks (70) and goats (6).

TABLE III

Breed	No. of animals
Cross-bred	39
Non-descript	23
Jersey	426
Brown swiss	6
Buffaloes	3
Goats	6
Total	83

There was no specific breed predisposition. All breeds including the non-descript category were found to be affected. However, more cases were observed in

cross-bred animals. This may be due to the fact that at present in Kerala, the cattle population is mainly cross-bred animals.

1.2. Sex wise incidence:

The higher frequency of incidence in the female was evident from the data collected (Table IV).

TABLE IV
Sex wise incidence of the tumour

Breed	Male	Female	Total
Cattle	7	70	77
Goats	-	6	6
Total			83

Again this has to be viewed against the back ground that majority of the livestock population is females. It would appear that males are also equally susceptible, since even though males are only few, the animals kept for breeding purposes, have also been affected in many instances. In the case of bullocks, although population is relatively high the incidence has been low. The observations made so far indicate that factors other than the breed is playing an important role in the causation of the disease. However, production stress, seems to have some bearing in precipitating the disease.

1.3. Age incidence:

The age wise incidence has been set out in Table V. The highest incidence was found in the age group of 6-9 years followed by above nine years group and 3 to 6 years group. The earliest case recorded was in a cow aged three years. The observations made during this year, confirms the last years finding that animals in the peak production period are getting affected. The relatively very low incidence in the 3-6 years age group and absence of record of any case below 3 years would support this observation.

TABLE V

Age wise incidence of the tumour - Cattle and Buffaloes

3-6 years	6-9 years	above 9 years	Total
3	49	25	77

In the case of goats also these observations were true. All the six cases recorded were in the age group of four to six years.

1.4. Seasonal incidence:

The seasonwise distribution of the incidence has been documented in Table VI. From the information gathered and data collected, there is relatively high reporting of cases during July and August. During April, May and June the incidence was ~~xxx~~ relatively low. The incidence was slightly high during January. The observations recorded during this year also were very similar to the findings made during the last year. Considering the data for the two years it is observed that there is relatively high reporting of cases during July and August. This may be attributed to the prevalence of rainy season during this period and animals may show exaggerated symptoms and since they are stall fed during this period, owners may detect the symptoms easily. Therefore, it would appear that season has no direct aetiological bearing in the precipitation of the tumour, during this period.

TABLE VI

Season wise incidence of the tumour

Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec.
15	5	8	6	4	5	9	10	5	4	6	6

2. SYMPTOMATOLOGY

2.1. Nasal discharge:

In all the cases studied, intermittent nasal discharge which was mucus in nature at first and mixed with blood later was the earliest symptom. This information was elicited by personal discussion with the farmers. The animals were seen frequently licking the nostrils with the tip of the tongue. It is understood that this symptom had gone unnoticed in many of the cases. The ailing animals were brought to the notice of the Veterinary Surgeons only when symptoms were much advanced. The Veterinary Surgeons also are not well informed about the early diagnostic features of the disease. Therefore, in order to educate the Veterinary Surgeons and farmers a pamphlet in Malayalam language, detailing the symptoms, methods of diagnosis and other details was prepared and printed for distribution to the farmers and Veterinary Surgeons in the state. The details of the clinical symptoms observed in the animals examined during the year have been shown in table VII (See appendix).

2.2. Epistaxis:

Intermittent epistaxis was encountered in 14 cases. This observation would suggest that it is not a common symptom. But in certain instances the first appreciated clinical symptom was epistaxis and often the bleeding was profuse. Occasionally uncontrollable bleeding also resulted. In certain instances this was the symptom which first drew the attention of the farmer.

2.3. Respiratory difficulty:

In all the animals examined respiratory difficulty was a consistent finding. The intensity varied from slight to severe. In the later stages animals manifested mouth breathing and abdominal type respiration. There was pronounced snoring sound towards the terminal state. The animal often held the neck stretched with

the head slightly lifted. Frequently frothy saliva oozed out from the mouth. For minutes the animal stood still with adducted fore legs without moving or eating.

2.4. Exopthalmos:

Exopthalmos, unilateral or bilateral was a common feature. In all the tumour bearing animals, except seven, exopthalmos was recorded.

Exopthalmos of the left eye was recorded more commonly than than right eye. Bilateral exopthalmos was seen in only one animal (table VII). In all the goats examined there was exopthalmos (Right side-1) (left side -5). In many cases the animals were blind on the eye which showed exopthalmos. In a few cases there was conjunctivitis and purulent keratitis. This was encountered in later stages of the disease.

2.5. Subcutaneous swelling on the forehead:

The protrusion of the tumour tissue into the subcutaneous tissue of the forehead was observed in 14 cases. In the initial stages only a small hole about 0.5 cm to 1 cm was noticed on the frontal bone. Subsequently, as the growth progressed the diameter of the perforation increased and the tumour mass protruded out. The size of the growth varied from a large orange to that of a coconut. Occasionally the swellings were multiple and two or three well defined swellings were evident.

The swellings on the forehead appeared between the eyes 2 or 3 cm below the horizontal line drawn between the inner canthus of the two eyes. Once the swelling was evident, during the course of two weeks it assumed a very big size and bone cavitation enlarged in size. The swelling was moderately soft in consistency.

2.6. Pregnancy:

Out of the 48 animals subjected to detailed examination, in fourteen instances the animals were pregnant when the tumour condition was diagnosed. The association of pregnancy and clinical diagnosis of tumour was also observed during the last year. It may be that the symptoms are exaggerated due to pregnancy stress. The stimulatory effect of hormones associated with pregnancy on the growth of tumour has also to be considered. This can be confirmed by undertaking further studies on the hormonal profile of these animals.

3. CLINICO-PATHOLOGICAL STUDIES

3.1. Haematological studies:

The haematological data of tumour bearing animals have been shown in table VIII. Generally there was anemia characterised by low Hb level and erythrocyte count. It was hypochromic microcytic type. The respiratory distress, low consumption of feed and the tumour growth would all have contributed to this. There was no increase in ESR. The same observation was recorded during the last year also. This observation again confirms the fact that in spite of the tumour growth there was no significant systemic disturbance in the animal so as to reflect a change in the ESR and also that ESR has no diagnostic value in the diagnosis of bovine cancer.

The blood smear examination of the tumour bearing animals did not reveal any bacterial or protozoan organisms. The detailed haemogram has been set out in table VIII. Moderate to severe anemia was generally observed. The erythrocytes revealed morphological abnormalities like anisocytosis and basophilia.

TABLE VIII

Haematological Data of Tumour Bearing Animals

Sl.No.	Animal No.	Hb	TC	DC			
				L	N	M	E
1.	Cow 58	8.0	8,800	70	26	2	2
2.	Cow 62	6.8	7,050	67	23	5	5
3.	Bull 63	10.0	4,800	54	32	6	8
4.	Cow 67	8.0	8,600	62	30	4	4
5.	Cow 68	8.6	9,750	56	35	2	7
6.	Cow 69	11.2	11,500	60	31	2	7
7.	Cow 70	10.0	9,500	51	43	2	4
8.	Cow 73	10.2	10,550	66	25	6	3
9.	Cow 74	10.4	9,600	49	30	7	14
10.	Cow 76	10.6	4,600	65	21	4	10
11.	Cow 77	6.8	5,600	55	27	3	15
12.	Bullock 78	7.0	9,500	35	58	5	2
13.	Bullock 79	12.0	8,250	56	24	6	14
14.	Cow 80	11.0	5,750	57	39	2	2
15.	Bullock 81	14.2	12,500	56	30	4	10
16.	Cow 82	10.8	13,250	54	41	2	3
17.	Cow 83	10.8	8,450	68	20	2	10
18.	Cow 89	10.2	5,750	43	57	0	0
19.	Buffalo 90	10.8	6,500	40	55	2	3
20.	Cow 92	7.2	7,500	59	29	0	12

Leucocytosis was slight to moderate. In seven animals it was neutrophilic leucocytosis and in the rest of the animals it was lymphocytic leucocytosis. It may be observed that, neutrophilic leucocytosis was associated with advanced lesions showing secondary suppuration. The moderate lymphocytic leucocytosis could be considered as an immunological response in the tumour affected animals; a means of tumour suppression by immunological defence. The data again confirms the last years observation that tumour progression can be suppressed by immunomodulation in the early stages of cancer growth.

3.2. Plasma protein estimation:

Plasma protein was estimated in 17 tumour bearing animals. The data have been incorporated in table IX. In six tumour bearing animals there was slight reduction in plasma protein. Since the animals were eating only very little and had developed neoplastic cachexia, the low value can be explained. This was true particularly in animals with lesions well advanced. Similar findings were recorded in the last year also.

3.3. Calcium and phosphorous:

Calcium and phosphorous levels in the serum of tumour bearing animals were estimated (Clark and Collip, 1925). The data have been set out in table IX. In many of the animals there was an imbalance in the calcium and phosphorous ratio. An identical observation was made in the previous year. The variation was observed in those cases in which there was severe rarefaction and perforation of the bone. It is to be considered as a sequelae of bone rarefaction by the tumour tissue. This would result in mobilisation of calcium from the bone, resulting in an imbalance of calcium phosphorous ratio. Histologically varying degree of rarefaction of the bone could be identified in these cases.

TABLE IX

Serum Plasma Protein, Calcium and Phosphorous Level in
Tumour Bearing Animals

Sl.No.	Animal No.	Plasma protein gm/d. lit	Calcium mg/300 ml	Phosphorous mg/100 ml
1.	40	7.9	6.8	4.3
2.	41	7.10	10.2	4.4
3.	42	7.10	11.10	7.40
4.	43	5.70	11.20	5.60
5.	44	7.6	7.50	4.20
6.	45	6.75	12.0	6.30
7.	46	6.25	10.5	7.10
8.	47	5.95	7.6	5.40
9.	48	8.40	10.3	5.20
10.	49	7.25	8.70	5.30
11.	50	7.20	8.40	4.20
12.	62	6.6	7.6	4.30
13.	65	7.25	5.4	3.40
14.	68	6.30	9.4	6.70
15.	69	8.25	8.5	5.40
16.	75	7.40	6.4	4.70
17.	76	6.75	8.2	6.70

3.4. Exfoliative cytological studies:

Early diagnosis of the tumour is very important to undertake a suitable line of treatment. To explore the possibility of using exfoliative cytological studies as a method of early diagnosis the nasal washings, deep nasal mucosal smears and free nasal discharge smears from animals in the susceptible age group and tumour bearing animals were subjected to detailed cytological studies. The smears were stained by Papanicolaou's method and Schon's method of staining, besides routine haematoxylin-eosin stain and Giemsa's stain. In all, 510 nasal smears were examined from cattle and 45 smears from goats. Thirty eight positive cases were detected and six of these were in the early tumour bearing stage. Nasal discharge screening has found to be of use in the diagnosis of ethmoid tumours. The observations made in the last year that for early diagnosis this method could be of use, was confirmed.

The morphology of the cells in the nasal smears was distinct. The cells were large with hyperchromatic nucleus and pale blue cytoplasm. Marked enlargement of the nucleus, clumping of chromatin, anisokaryocytosis and anisocytosis were frequently observed in positive cases. Cytoplasm occasionally showed vacuolation. Varying proportions of neutrophils were also seen. Clumping and formation of syncytia were also observed. Cells in mitotic division were occasionally observed. The neoplastic cells were distinctly different from the normal squamous epithelial cells which were orangeophilic. The cytological features of the cells, were also identifiable by Haematoxylin and eosin stain, but they were not as conclusive as other stains. Some of the cells in certain cases contained cytoplasmic hyaline inclusion bodies.

3.5. Radiographic studies:

As an aid to diagnosis of the tumour growth x-Ray photographs of the head of tumour bearing cattle and goats, were taken. X-Ray photographs of the tumour bearing animals were taken from different angles. The lateral view was found to be the best for detecting the tumour growth in the ethmoid region. It was found to be relatively easy for interpretation in the case of goats than in cattle.

3.6. Tracheotomy:

The animals bearing tumour when brought to the hospital for medical attention have invariably respiratory difficulty of a severe degree. Many of the animals were also pregnant. Therefore, with the objective of relieving the clinical symptoms tracheotomy was performed in 16 animals. In these animals there was great relief in the symptoms manifested by the animals. The animals will start eating and will show a temporary improvement. In the near term of pregnancy this technique was useful to deliver the calf normally. If this is not done the cow and the calf will die due to severe respiratory distress. This could be attempted in field conditions.

3.7. Evaluation of cerebrospinal fluid:

Cerebrospinal fluid (CSF) was collected by lumbar puncture. The CSF was analysed in 14 tumour bearing animals. The fluid was clear and there was no increase in chloride content. Total cell count did not exceed more than 700. The cells were lymphocytes and there was no evidence of any tumour cells, even in advanced cases.

4. IMMUNOLOGICAL STUDIES

4.1. Response to tumour antigen:

This test was done with the objective of evaluating the difference, if any, in tumour bearing and control animals to the response of tumour antigen, and to explore the possibility of using this test, as a diagnostic tool. The tumour antigen for the study was prepared as described in the Annual report for the year 1978. The tumour antigen was given intradermally at the left neck region at three different sites after shaving and disinfecting the area with spirit. A dose of 100 µg of tumour antigen was injected at each site. The skin thickness at the site of injection was measured before giving the tumour antigen and at 24 and 48 hours after the injection. The test was done on 12 animals during the year. Skin biopsies were taken from these sites for histopathological examination after 24 hours and 48 hours. The data on skin measurement on analysis did not reveal any significant difference in tumour-bearing animals when compared to the controls. The skin tissues collected in formal saline were processed for histopathological examination.

4.2. Response to BCG

The cell mediated immune response in tumour bearing animals was evaluated with BCG as the test antigen. The BCG (1 mg BCG i'D) was administered at three different sites in tumour bearing animals and healthy control animals in the neck region after shaving and sterilizing the area. The skin measurements were taken at 24, 48 and 72 hours. Statistical analysis did not reveal any significant difference in the tumour bearing animals when compared to the control animals at 5% level. However, differences could be observed if interpretation was done at 8% level. In biological interpretation of data, this factor has to be borne in mind. The detailed infor-

mation on this will be furnished subsequently.

The biopsy of the skin at the site of inoculation was taken at 24 and 48 hours for histopathological examination. The tissues were preserved in 10% neutral formalin.

4.3. Response to Tuberculin :

In BCG vaccinated-tumour-bearing animals, the hypersensitivity response was evaluated using tuberculin as the recall antigen. The tuberculin was given six weeks after BCG vaccination. The test was performed in six BCG vaccinated non-tumour bearing control animals. The tuberculin for the study was obtained from the IVRI, Izatnagar. The testing was done by giving 0.1 ml tuberculin intradermally at the left neck region, after shaving and disinfecting the area. The thickness of the skin at the site of injection was measured before the inoculation and 24 and 48 hours after inoculation of tuberculin. The skin area was biopsied at 24 and 48 hours. Studies are in progress.

4.4. Studies on lymphnode reaction to BCG and Tumour Antigen in tumour bearing and control animals:

- a. The tumour bearing animals were divided into two groups, Vaccinated and non-vaccinated.
- b. The pathological changes induced by BCG (Bacillus Calmette Guerin) and T.A. (Tumour antigen) on prefemoral lymphnodes in these two groups were studied in order to assess the immune response in the tumour animals before and after vaccination. It was also envisaged to evaluate the immunobiological behaviour of the lymphoid tissue to tumour antigen and BCG. It may also be mentioned that BCG has been used as a non-specific immunostimulant in tumour bearing laboratory animals and man. These studies will help in monitoring the immune status of the affected animals and also to find out whether the animal can respond to vaccination

or any other form of stimulus which may enhance the cell mediated immunity to cause suppression of the tumour which is getting established in the body. It was assumed that after giving BCG and TA to a tumour bearing animal, local draining lymphnodes of both sides are examined the relative response to both BCG and TA can be assessed. The objective was to assess the comparative efficacy of BCG and TA as of immunostimulants. For these trials both the groups (Vaccinated and non-vaccinated) were given i/D TA (0.2 ml (200micrograms) and BCG 0.2 ml (1.25 mg). The lymphnode biopsies were taken at 3 days, 6 days, 9 days, 12 days and 15 days intervals in both the groups.

Tumour antigen was given on the left side and BCG on the right side. Both the lymphnodes were weighed immediately after their removal (Table XIII).

The impression smears were incubated at 36°C with NBT (Nitro blue tetrazolium salt) for $\frac{1}{2}$ hour and then kept at room temperature for 15 mts and then stained with Wright's stain. As a routine some of the impression smears were stained with Wright's stain alone to demonstrate the type of reacting cells in the lymphnode.

The cells in the NBT incubated smears were examined for the NBT positive macrophages (Table XII). Lymphocytes do not give the positive reaction with this test. Total of 500 macrophages (Identified mostly based on their morphological characters) in the smears were counted consisting of both NBT positive and negative cells. The percentage of positive cells in both BCG lymphnodes and TA lymphnodes were compared (Table XI).

The number of positive cells given an indication of the number of cells activated and that in turn can be correlated with the potency of the stimulating agent.

TABLE X

Vaccinated animals dosed with TA and BCG

Dosage given

TA - 0.2 ml - 200 Micrograms.

BCG- 0.2 ml - 1.25 mg

3 days		6 days		9 days		12 days		18 days	
No. of animals	Animal No	No. of animals	Animal No	No. of animals	Animal No	No. of animals	Animal No	No. of animals	Animal No
3	C.64	2	C.69	2	62	1	C.80	2	C.65
	C.68		C.58		83				B.81
	C.70								

TABLE XI

Non vaccinated animals dosed with TA and BCG

3 days		6 days		9 days		12 days		15 days	
No. of animals	Animal No	No. of animals	Animal No	No. of animals	Animal No	No. of animals	Animal No	No. of animals	Animal No
2	C.82	1	C.93	2	C.73	3	C.67	1	C.76
	C.92				C.95		C.74		
							C.75		

In order to study the effect of non-specific proteins and tumour antigen healthy non-tumour bearing animals were dosed with egg albumin and tumour antigen.

The biopsied lymphnodes fixed in buffered neutral formalin were processed and paraffin blocks were made. Histological studies of these lymphnodes sections are in progress.

TABLE XII
NBT Test in Lymphnode Impression smears.

Sl. No	Animal No	Total	BCG			TA			Days after infection	
			+ ve	- ve	%	+ ve	- ve	%		
1.	81	500	61	435	12.5%				15	+
2.	83	500	109	391	21.8%	144	356	28.8%	9	+
3.	92	500	146	354	29 %	124	376	24.8%	3	-
4.	93	500	204	296	40.8%	169	341	33.8%	6	-
5.	95	500	49	451	9.8%	82	418	16.4%	9	-

+ Vaccinated
- Non-vaccinated

- Bull No 1 (81) was destroyed 24 days after this test. In this animal the left lymphnode where TA was given could not be taken (Vaccinated group)
- 2 (C.83) animal died 14 days after this test. (Vaccinated group)
- 3 (C.92) Animal died 15 days after this NBT test. (Non-vaccinated)
- 4.(C.93) Animal is still living (Non-vaccinated)
- 5 (95) Animal died 4 days after this NBT test. (Non-vaccinated)

TABLE XIII

Weight of the Lymphnodes of tumour bearing animals
(Vaccinated/non-vaccinated)
(Fresh matter basis)

Sl. Animal No	Vaccinated or nonvaccinated	Days	R(BCG)	L(TA)
1. C.70	Vaccinated	3	5.1gm	5.4gm
2. C.73	Non vaccinated	9	5.15gm	4.92gm
3. C.74	Non vaccinated	12	4.6	2.02
4. B.75	Non vaccinated	12	4.3	5.5
5. C.76	Non vaccinated	15	3.5	3.2
6. C.80	Vaccinated	12	1.9	1.7
7. C.81	Vaccinated	15	10.2	-
8. C.82	Non vaccinated	3	2.6	2.35
9. C.83	Vaccinated	9	5.32	5.46
10. C.85	Non vaccinated	6	9.75	8.8
11. C.92	Non vaccinated	3	3.95	2.95
12. C.93	Non vaccinated	6	1.85	1.45
13. C.95	Non vaccinated	9	5.25	5.55

TABLE XIV

Weight of lymphnode (Tumour antigen and egg albumin)

Sl.No.	Animal No.	Vaccinated or non vaccinated days	Tumour antigen Left side	Egg Albumin Right side	RTA	LTA
1.	Bull 78	Non vaccinated			3	6.90gm 6.970gm
(Tumour animals)						

BCG - Right side TA - Left side

Sl.No.	Animal No.	Vaccinated or non vaccinated days	R.T. 1.node	L.T. L.node
79.	Bull 79	Control healthy nonvaccinated	6	15.83gm 15.05g

The NBT test done so far indicate that in vaccinated animals the activated macrophages were more in the left Lymphnodes (TA treated) when compared to the Right Lymphnode (BCG treated).

In the nonvaccinated group, the activated macrophages (NBT positive cells) were more in the Right Lymphnode (BCG treated) when compared to the left side lymphnode (TA treated).

This correlation was also observed in weights of the lymphnodes in both vaccinated and non-vaccinated groups.

In non-vaccinated groups the right lymphnodes (BCG given) in almost all the cases weighed more when compared to left lymphnodes.

In vaccinated groups the left lymphnodes were having slightly more weight than the right lymphnodes.

The observations so far made indicate that BCG is the more powerful immuno-stimulant than the tumour antigen in non-vaccinated animals, but when once the tumour animals are vaccinated, the tumour antigen may act as a powerful stimulant which can be attributed to the similar type of antigenic stimulus by vaccine and purified tumour antigen. Further studies are in progress.

4.5. DNCB (Di-nitrochloro benzene) test:

In order to assess the cell mediated immune response in tumour bearing animals DNCB test was done. The animals were sensitised by application of 2 mg of DNCB in 0.1 ml acetone on the skin. The site of application was over an area of 3 cm in diameter on the side of the neck. The area was shaved and skin thickness was measured before application of DNCB. The challenge dose of 100 U_g of DNCB was applied after 14 days and skin thickness was measured 24 hours and 48 hours post sensitisation.

Skin biopsy was taken subsequently, for histopathological examination. Healthy control animals and tumour animals were tested. There was no significant response in either tumour animals nor in control animals, suggesting that one application of 2 ml in 0.1 ml acetone was ^{not} sufficient. Therefore, the experiment was redesigned and 1 ml of DNCB containing 2 mg in 0.1 ml acetone was applied for seven days consecutively. There was severe necrosis of the skin, much exudation and peeling of the skin.

A third experiment was designed to standardise the DNCB dose for sensitisation as well as challenge dose. DNCB 0.2% in 0.5 ml acetone was applied on two sites at the neck region for five successive days. On the 14th day 0.2% of DNCB in 0.5 ml acetone was applied as challenge dose. With this dose schedule there were no undesirable effects, but the reaction, appeared to be slightly severe.

In the fourth trial, in order to get a minimum appreciable reaction with a minimum number of application at the sensitising site, the sensitising dose schedule was reduced from 5 to 3 days. On challenging on the 15th day there was slight induration, but there was no peeling of the skin or severe oedema. Hence this schedule of sensitisation was found to be the best

The DNCB test, by different experimental designs has been now standardized and perfected in cattle. The preliminary studies have shown that in early stages of tumour there is stimulation of cell mediated immuneresponse in animals. Further studies are in progress to collect more data for statistical interpretation and the effect of immunotherapy. The test could be advantageously used to identify the animals in which immunotherapy could be attempted as a measure of tumour supression. Studies are being continued to elucidate the pattern of histological reaction in tissue to DNCB in control and tumour bearing animals.

4.6. Assessment of Macrophage function in Tumour Bearing Animals:

The macrophages have an important role in tumour cell destruction. The functional ability increases with specific or nonspecific immunostimulation. Therefore, with the objective of studying the response of Macrophages to immunomodulation by spontaneous tumour development and immunostimulation by vaccination, this study was designed.

Dextran sulphate, a 2% solution, 0.4 ml was injected subcutaneously into the skin fold by the side of the tail. The skin biopsy was taken at 24 hour intervals for seven consecutive days. From each animal paired samples were taken at every time. Immediately after skin biopsy, impression smears were taken from the cut surface of the skin. The biopsy tissues were fixed in 5% neutral formal saline. The impression smears were stained with Wright's stain to study the pattern of cellular response. Macrophages were present in large numbers along with lymphocytes. The macrophages had engulfed dextran sulphate particles in the cytoplasm. A few neutrophils were present at the site but did not contain dextran sulphate.

On impression smears, Nitroblue tetrazolium test was also done (NBT test). The impression smears were incubated with NBT solution at 36°C for $\frac{1}{2}$ hour and then was left at room temperature for 15 minutes. Subsequently the smears were stained with Wright's stain. The macrophages which ingested the Dextran sulphate particles were strongly NBT positive and few macrophages which had not ingested Dextran sulphate particles were negative for NBT test. The neutrophils were NBT negative. After the 5th day onwards there was progressive increase in the number of macrophages and there was also increase in the number of ~~macrophages and there was also increase in~~ particles ingested by macrophages. The technique

has been perfected and studies have to be done in more number of animals to analyse and interpret the data. Further studies are in progress.

~~xxxxPhytohaemagglutinin Test~~

4.7. Phytohaemagglutinin Test:

In order to monitor the cell mediated immune response in tumour bearing animals, the cutaneous reaction to PHA was studied in healthy control animals and tumour bearing animals.

Ten micrograms of PHA in 0.1 ml distilled water was given intradermally. The skin thickness was measured 24 hours, 48 hours and 72 hours later. Skin biopsies were also taken after 72 hours to study the histological reaction. The tissues were fixed in 5% neutral buffered formalin for histological studies. The test was performed in 15 tumour bearing animals and data have been collected. The maximum response was observed in 24 hours. The data so far collected have been presented in Table I. Further data have to be collected for detailed analysis and interpretation of results. Studies are in progress.

PHA cell mediated immunity tests were done on 15 tumour bearing animals and one control animal. Dose - 10 μ g in 0.1 ml distilled water given I/D. The skin thickness was measured initially before giving PHA I/D and then later after 24 hours, 48 hours and 72 hours. The skin biopsies were taken at these intervals.

are immunocompetent and immunomodulation is possible. The test was found to be very useful in evaluating the immune status of the tumour bearing animals.

4.9. Effect of Phyto Haemagglutinin (PHA-M) on Peripheral Leucocytes:

The cell mediated immune response in tumour bearing animals was assessed by making use of the blast transformation index of peripheral leucocytes in vitro with PHA stimulation. The technique adopted has been detailed in the Annual Progress Report for 1978. The test was conducted with blood samples collected from 10 tumour bearing animals. The data have been collected. The data are being analysed for significance.

5. TUMOUR CELL CULTURE

Two different techniques were employed to establish the tumour cell line in vitro.

5.1. Explant culture:

Pieces of tumour tissue collected immediately after slaughter were suspended in Hank's balanced salt solution containing 100 iu of penicillin and 1000 µg of streptomycin. The tissue pieces were washed three times in the same solution before it was minced into small pieces of 1mm size. A portion of this minced tissue pieces were suspended in tissue culture growth medium and were seeded on to Roux flasks, 100 ml tissue culture bottles or 160 mm Petri dishes and incubated at 37°C after gentle shaking to distribute the tissue pieces. On the 4th day the flasks were gently shaken to dislodge the larger pieces from the site of cellular attachment to the glass surface and growth. The medium was poured off and replaced with fresh growth medium. In 14 cases with apparently new, uncontaminated growth, tissue culture was attempted.



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In five instances cell growth was evident. The cells grew for 4 to 6 days. But on subsequent passages the cells lost their viability.

5.2. Dissociated Cell Culture:

The other half of the minced tumour tissue was washed three times in calcium, magnesium free buffer (pH 7.6) and trypsinised for 20-30 minutes with 0.25% Difco trypsin (1.250) in CMF. After allowing the tissues to settle the supernatant containing dispersed cells was filtered through double layered sterile muslin cloth and centrifuged at 1000 rpm for 8-10 minutes. The cell sediment was resuspended in fresh growth medium and again washed three times with growth medium. These washed cells were resuspended in fresh growth medium to get a final concentration of 5×10^5 cells/ml. Then the material was seeded on to Roux flasks, tissue culture bottles and test tubes. They were incubated at 37°C. The tumour tissue from 11 tumour bearing animals were cultured by this technique and cell growth was obtained in 3 instances. Here also the cells were viable and showed progressive growth till 6th day but subsequently the cells degenerated and did not grow.

There has been considerable difficulty in establishing the tumour cell line. One major problem was contamination. The culture medium often was over grown by bacterial and fungal organisms. The tumour tissue in the animal itself was heavily contaminated. In spite of employing antibiotics like Ampicillin and Gentamycin there was overgrowth by contaminant microbes. Besides this, the tumour cells did not manifest a healthy continuous growth. Perhaps, the heavy dose of antibodies to check contaminant growth might have interfered with tumour cell growth in vitro. It may also be pointed out that since the tumour tissue is directly exposed to the environment, and the labour^{ed} deep respiratory inhalations may cause numerous environmental bacteria to be inhaled into the tumour mass. This heavily

contaminated tumour growth, may ~~not~~^{not} yield viable tumour growth easily. However, further attempts are being made.

6. VIROLOGICAL STUDIES:

6.1. Virus isolation trials:

Tumour tissue samples were collected and tumour tissue suspension was made in Hank's balanced salt solution using standard procedures. The suspension was clarified by centrifugation at 4000 rpm for 15-20 minutes.

The clarified tissue suspension formed the inoculum and 10 to 11 day old embryonated eggs were used for the study. The processed samples were inoculated into the chorio-allantoic membrane using 5 eggs/sample. Embryos that died after 24 hours and those alive even after 5 days following inoculation were chilled at 4°C. The allantoic and amniotic fluids were subjected to haemagglutination test with RBC. When all the tests were negative a pooled suspension was prepared from the embryo, CAM, allantoic and amniotic fluids and was used for subsequent passage. A sample was considered negative only when three blind passages were carried out. Seventeen samples were tested and seven samples tested were found to agglutinate chicken RBC. There were no lesions in the membranes or embryo. Four of these samples were studied further (STV,4; STV5, STV18 and STV38). These isolates were ruled out to be New Castle disease virus by appropriate tests. These isolates also agglutinated human 'O' and guinea pig red cells.

The sera of animals from which tumour tissue was collected for studies and sera of non-tumour bearing animals did not show any significant antibody titer. Haemagglutination inhibition titers of these isolates as well as New castle disease virus was below 8. Beta method was followed in all H I tests.

The isolates were sensitive to chloroform. Haemagglutination was inhibited in 15 minutes at 56°C. The strain was filterable through 200 mm filter. Isolates of STV 15 and STV 38 were pathogenic to day-old chicks.

Pathogenicity of the isolates to week-old chicken was also studied by oral administration of STV 18. There was mortality on 4th and 8th day. The remaining birds were kept for 32 days. They had H I titers ranging from 16-256 and resisted challenge with virulent NDV.

To observe whether the tumour animals secreted virus through expired air a batch of unvaccinated week-old chicks were reared in the animal shed where tumour bearing animals are housed (ST Chicks). After two weeks exposure these were transferred to an infection free room and reared until they were six weeks old. Similar trial was carried with non-tumour bearing animals but the chicks exposed to tumour bearing animals showed antibodies to STV 15 and NDV but control chicks did not show any on challenge with virulent NDV all the ST chicks withstood challenge while all the controls died of New Castle disease. The study is being repeated.

Meanwhile one of the strains (STV 15) was inoculated into the ethmoid region of three one year old male calves. One of them died two months after infection. At autopsy the ethmoid region was found highly congested and had nodular swelling which contained gelatinous material. The other tumour calves are alive and are being regularly screened by X-Ray, to detect tumour development, if any.

When all the tumour animals did not show any H I antibodies to the isolates they were also tested against antisera to 3 MK cl extracted tumour antigen and whole tumour extract by immunodiffusion tests. All the four isolates did not react with either of the two.

Cell culture studies:

Chicken embryo fibroblasts prepared from 10 day embryonated eggs were used for this ~~xx~~ purpose. Monolayer cultures of CEF were infected with STV-15 and examined every 24 hours for any cytopathic changes. The infected cells began to show CPE characterised by rounding and clumping of cells from 48 hours onwards. Cellular destruction and detachment from the glass surface was complete in 96 hours. On staining with May Grunwald-Geimsa the marked change noticed was severe vacuolation of the cytoplasm. The nucleus appeared normal. No inclusion bodies could be identified.

6.2. Viral Antibodies in Serum:

With the objective of finding out the involvement of viral agents in the aetiology of the tumour, attempts were made to detect antibodies against Herpes Virus in tumour bearing animals. Serum from 16 tumour bearing animals were screened. MD vaccine was used as the antigen and gell deffusion test was performed. There was no indication of the presence of viral antibodies against Herpes Virus in the Serum of tumour bearing animals tested.

7. BACTERIOLOGICAL STUDIES

Organisms that were usually associated with contamination of tumour cell culture were isolated and identified by various biochemical tests.

7.1. Characteristics of the isolates:

The organisms were gram negative and grew very well in nutrient agar. The colonies were small about 1-2 mm in diameter with smooth rounded edge and convex surface and was transparent. In blood agar the colony characters were the same and was non-hemolytic. They were lactose fer^menters as the colonies formed in Mac Conkey's agar were pink in colour. In tripple sugar iron agar slants the isolates produced an acid bud and an alkaline slant, but no hydrogen sulphide.

Biochemical reactions:

Citrate	Variable
Nitrate	Positive
Indole	Negative
N R	Positive
VP	Negative
Deaminase test	Negative

The above characteristics of the organisms showed that they are indistinguishable from Escherichia coli.

Antibiotic sensitivity:

Resistant to most of the antibiotics except gentamycin.

7.2. Experimental infections:

Twenty-one, day old mice received from the small animal breeding station were inoculated intra-peritoneally with 0.1 ml each of 18 hour old broth cultures (A) while the control animals received the same amount of nutrient broth by the same route (Group B). Except some symptoms of sickness shown (by group A) during the first 24 hours both control and inoculated ones remained normal. These animals are still under observation.

8. IMMUNOTHERAPY

8.1. Non-Specific Immunotherapy:

Inoculation of BCG into the lymphnodes: There are several reports particularly in man and experimental laboratory animals indicating the beneficial effects of non-specific immunotherapy with BCG in tumour bearing individuals and laboratory animals. Different routes of therapy have also been followed. With a view to study the beneficial effects of such immunotherapy in the animals bearing tumour of the mucosa of the ethmoid, BCG was employed by different routes.

a. Inoculation of BCG into the lymphnode:

BCG was given at a dose of 2 mg directly into the left parotid lymphnode of six tumour bearing animals. The animals were observed for clinical progress of the disease. The results were not encouraging. It may also be mentioned that most of the animals were in advanced stage of the tumour growth. This may be the reason for not getting sufficient immunostimulation so as to cause suppression of tumour growth. The lymphnodes were collected for histopathological examination. There was stimulatory effect in the lymphnodes characterised by severe histocytic and macrophage reaction. Large numbers of epithelioid cells were seen in certain instances. Diffuse lymphoid hyperplasia in the paracortical region was another feature, suggesting a T cell stimulation. There was no follicular response and germinal centre activity.

b. Intralesional inoculation of BCG:

Experimental studies in tumour bearing human beings and laboratory animals have indicated tumour regression following this line of treatment. BCG was therefore given into the lesion direct in those animals in which there was perforation of the frontal bone. The BCG was inoculated into the tumour tissue, using a long needle at different sites of the tumour tissue. The treatment was done in five animals. When the dose of 2.5 mg was followed there was enhancement of tumour growth and the animals succumbed to tumour early. However, when the dose was reduced (640 micrograms) and given in a more diluted concentration there was increase in the expected survival period. Histological examination of tumour tissues of some of the dead animals revealed areas of necrosis of the tumour tissue and multiple focal areas of lymphocytic and macrophage reaction. The studies so far made indicate that there is certain amount of beneficial effect. But if the tumour burden is more at the time of therapy, (the animals are only

diagnosed to have cancer only late) the clinical curative effect is less. Further, most of the bony skeleton have been already destroyed at this stage and invasions of the tumour into the cranium have also taken place. It would appear, that this line of treatment has certain beneficial effects.

8.2. Specific immunotherapy:

The vaccine (irradiated tumour cell vaccine containing Freund's adjuvant) developed during the last year was tried in 18 tumour bearing animals. A dose of six milliliter (3 ml tumour cell suspension + 3 ml Freund's complete adjuvant) was given subcutaneously or deep intramuscularly.

After vaccination the response of animals was monitored by studying the peripheral leucocyte profile in these animals. The data have been shown in table (table XVI). There was post-vaccination leucocytic response in tumour bearing animals.

Haematological studies:

1. The blood picture was studied as soon as the animals were brought from the field and also before vaccination.
2. After vaccination at fortnightly intervals the blood values were studied. This was continued till the animal died or till it was discharged (Table XVI).
3. In general in almost all the vaccinated animals, two weeks after vaccination there was an increase in the total leucocyte count. Lymphocytes and monocytes showed slight increase in absolute counts. Leucocytosis and lymphocytosis continued nearly up to 2 months and then started declining.
4. Each individual animal's haemogram has been given separately with its interpretation in the table (Table XVI).

TABLE XVI

Post vaccination leucocytic response of tumour bearing animals

Sl. No	Animal No.	Day	Hb	TC	DC				Remarks
					L	N	M	E	
1.	Cow 58	15	8.00	8,800	70	26	2	2	The animal died 4 days after the last blood picture. The animal showed good response to the vaccine and leukocytosis continued upto 60 days then declined and before death there was slight neutrophilia and absolute eosinopenia.
		15	8.00	9,600	67	22	9	2	
		30	7.8	8,900	61	31	6	2	
		45	7.5	9,050	59	31	7	3	
		60	6.8	6,100	65	26	6	3	
		75	6.8	7,050	65	29	4	2	
		90	7.8	8,950	75	20	3	2	
		105	7.8	12,800	52	42	3	3	
		120	7.6	11,500	61	34	3	2	
	135	7.8	11,550	54	40	2	4		
	150	6.8	7,900	57	42	1	0		
2.	Cow 62		6.8	7,050	67	23	5	5	Animal died 5 days after the blood picture. There was decrease in the leucocyte count seen after vaccination. The animal was not responding to the vaccination. There was only relative increase in lymphocytes. The general condition of the animal was very poor as indicated by the Hb values. As the animal was already in advanced state it has not responded to vaccination.
		15.	6.8	6,660	71	19	1	9	

Sl. No.	Animal No.	Days	Hb	TC	DC				Remarks
					L	N	E M	E E	
3.	Bull 63		10.0	4,800	54	32	8	6	Bull was destroyed 10 days after this blood picture. There was slight increase in TC values, bull has responded to vaccine, but started showing nervous symptoms so it was destroyed. There was perforation into the brain.
		15	10.0	6,650	61	22	5	12	
4.	Cow 68		9.6	9,750	56	35	7	2	Initially there was leucocytosis, but subsequently it dropped. Animal died 14 th day after this blood picture.
		15	10.0	11,500	54	38	2	4	
		30	10.0	8,150	58	35	5	3	
		45	10.0	10,550	55	42	1	2	
		60	9.2	8,200	73	20	2	4	
5.	Cow 69		11.2	8,200	73	20	4	2	The animal calved on 74th day and afterwards developed metritis. Neutrophils have increased and also TC. Hb value have come down. At present neutrophilia has come down blood picture showing normal values.
		15	11.0	11,500	60	31	2	7	
		30	11.2	12,250	54	30	7	9	
		45	9.6	10,850	54	29	3	14	
		60	9.2	7,250	62	21	1	16	
		75	8.8	12,400	46	35	2	17	
		90	7.0	12,400	69	27	2	2	
		105	7.2	16,500	47	48	3	2	
120	7.8	9,900	50	65	2	9			

Sl. No.	Animal No.	Days	Hb	TC	DC				Remarks
					L	N	M	E	
6.	Cow 70		10.0	9,500	52	43	2	4	The first increase in leucocyte count
		15	10.2	11,200	56	30	12	2	may be due to the vaccination effect
		30	9.6	9,350	49	43	4	4	but the 2nd increase in total leucocyte
		45	10.2	8,400	59	36	2	3	count after 75 days was due to neutro-
		60	9.2	7,220	50	46	2	2	philia %. Perhaps due to necrosis of
		75	9.6	12,400	62	28	1	9	the tumour tissue the animal was slowly
		90	9.2	14,050	37	42	9	12	going down in condition. Animal died
		105	9.0	9,900	54	39	3	3	4 days after this blood picture.
	120	7.8	10,500	30	61	3	0	Because of severe necrosis of tumour Because of severe necrosis of tumour tissue, neutrophilia was observed, TC has again gone up in the later stages. Typically before its death there was lymphopenia, neutrophilia and eosinopenia.	
7.	Cow 73		10.2	10,550	66	25	6	3	The animal probably was already in
		15	8.2	9,600	63	31	4	2	advanced stage of tumour and response to vaccination was not noted because the animal had already exhausted. The animal died 9 days after vaccination.

Sl. No.	Animal No.	Days	Hb	TC	DC				Remarks
					L	N	M	E	
8.	Cow 74		10.0	4,750	45	48	5	2	The animal died 4 days after vaccination. The animal was already in advanced state of tumour growth though there was increase in TC. Absolute neutrophilia was noticed probably because of extensive necrosis in the tumour and secondary bacterial invaders.
		15	9.8	11,700	40	58	1	1	
9.	Cow 76		12.8	11,500	53	44	1	2	The animal died 7 days after vaccination. Even after vaccination there was no increase in TC and there was slight neutrophilia indicating necrosis of the tumour tissue.
		15	10.8	9,500	47	48	3	2	
10.	Bullock 81		14.2	12,500	56	30	4	10	Bull was sacrificed 9 days after this.
		15	14.8	12,450	56	22	2	20	This animal showed good response to vaccine at 30 days period after 45 days the leucocytes was came response came down.
		30	14.8	14,550	41	48	5	4	
		45	13.8	9,900	57	22	13	8	

Sl. No.	Animal No.	Days	Hb	TC	DC				Remarks
					L	N	M	E	
11.	Cow 83		10.8	8,450	68	20	2	10	The animal died after 10 days. There was increase in TC values after vaccination but lymphocyte response was not observed in 2nd blood picture. There was only relative increase in lymphocyte values but the animal has not responded to the vaccine as the animal was already in late stages of tumour.
		15	10.2	10,500	34	56	3	7	
		30	10.0	9,050	63	22	4	11	

In ~~xxx~~ three animals a separate vaccine was given (3 ml of tumour cell suspension + 3 ml paraffin and 1.3 mg of BCG.)

In three animal vaccine employed in the first set was followed by BCG (1.3 mg) given at a nearby site.

The response to vaccination was monitored by
 1. Leucocytic response (2) Enhancement of survival period (3) Exfoliative cytological studies and the histological studies of tumour tissue.

There was significant increase in leucocytic count characterised by increase in lymphocyte and monocyte counts. Exfoliative cytological studies made at specific intervals have shown large number of necrotic cells in the discharge. Further examination of slides is in progress.

. On gross examination of some of the animals which had died, the tumour tissue was found to be a necrotic crumbling mass loosely attached to ethmoid region. In a few cases most of the tumour mass had necrosed and desquamated.

Histologically there was severe degree of necrosis and haemorrhage in the tumour tissue associated with lymphoid and mononuclear infiltration. The draining lymphnodes of the head were active, and there was diffuse proliferation of lymphoid cells and histiocytic reaction. Further studies are in progress.

In one of the animals which was in the early stage of confirmed tumour growth, there was marked clinical improvement characterised by disappearance of clinical symptoms and improvement of the general condition. After treatment and observation for 3 months, it was taken away by the owner. It is being observed, now it is more than nine months, animal has conceived and is apparently healthy now.

There is definite indication that there is immunological response against tumour growth following vaccination. But it would appear that the stage of the tumour growth had a direct bearing on the effectiveness of immunotherapy. Immunomodulation, can be effective, provided an early immunotherapy is instituted. Further detailed studies are envisaged.

9. TUMOUR TRANSPLANTATION STUDIES

. Tumour transplantation was attempted in homologous and heterologous hosts. Tumour transplantation employing fresh healthy tumour tissue from six tumour bearing animals was attempted. The tumour cell suspension containing 1 million cells /c mm was employed. Both subcutaneous and intraperitoneal routes were employed in young mice with and without immunosuppression with cyclophosphamide. In separate groups of mice every time small blocks of tumour tissue were also transplanted subcutaneously.

Tumour transplantation was also attempted in colostrum deprived cyclophosphamide treated (Immuno)suppression with cyclophosphamide 15 mg/kg body weight) cross-bred male calves. The cell suspension was given directly into the ethmoid region, subcutaneous tissue and by intravenous route.

In none of the experimental animals even after observation for 6-7 months there was evidence of establishment of tumour growth.

10. PATHOLOGICAL FEATURES

In all, 48 tumour bearing animals were subjected to detailed postmortem examination. The detailed report pertaining to each animal has been given separately. The animals examined considered of cross-bred cattle (34), non-descript cattle (8), buffaloes (4) and goats (2).

10.1. Gross lesions:

The animals were in varying stages of tumour development. Consistently the growth was found to arise from the mucosa of the ethmoid region. In all the cases the tumour was advanced and had completely destroyed the ethmo-turbinate region. The direction of the growth varied in different cases. It often extended in four directions. Lower down the growth had grown down into the nasal passage, and often extended half the distance down into the nasal passages. There was complete destruction of the nasal turbinates and the tumour tissue blocked the nasal passages either partially or completely. Anteriorly the tumour mass extended forwards, filled the frontal sinus and perforated the frontal bone and appeared in the subcutaneous tissue as swellings of varying size. This was observed in 14 animals. The perforation was either single or multiple and it varied in size from 0.5 cm to 15 cm in diameter. The bony structure had been softened and elevated. Frontal bone perforation was not encountered in bulls. The perforation of the bone was a late stage

in the clinical manifestation. Posteriorly the growth perforated the crebriform plate of the ethmoid and extended into the cranial cavity to a variable distance. This was encountered in 24 animals out of 48 animals examined. In the initial stages the tumour tissue formed adhesion with the meninges. There was severe compression of the poles of the cerebrum. The tumour mass got embedded into the brain and in a few instances filled the lateral ventricles of the brain. It may be noted that inspite of such massive invasion into the brain, nervous symptoms manifested clinically was meagre. Of the 24 brain affected animals only four animals showed nervous symptoms like walking in straight line in one direction, holding the head high, circling movements and pressing the head on the walls of the manger without eating anything.

Frontal sinus was consistently involved and later extended into the maxillary and spheno-palatine sinuses. Pharyngeal passage was almost completely filled up with the tumour mass in 16 instances. Invasion into the retrobulbar region was a common finding. Extension into the left retrobulbar region was noticed in 25 animals and into the right bulbar region in 14 instances. In eight of the animals there was no exophthalmos. In one instance there was bilateral exophthalmos.

The growth had often a smooth tough fibrous capsule. The consistency of the growth encountered varied. They were fleshy or soft or hard with bony spicules embedded. In certain instances cystic spaces filled with mucinous material were observed. Thick bands of stroma were seen intersupressed in the growth. Foci of haemorrhage and suppuration were also encountered in the tumour mass.

All the lymphnodes draining the head were regularly examined. Grossly, congestion, oedema and moderate enlargement were commonly noticed. Gross enlargement characterised by embedded greyish white mass of growth was encountered in 17 animals out of 48 tumour bearing

animals examined in detail. All the head lymphnodes were involved in six cases. Retropharyngeal lymphnode was the commonest lymphnode involved, followed by parotid and mandibular lymphnodes. The retropharyngeal lymphnodes were enlarged to the size of a large orange in many instances. These could be felt on clinical examination. Details regarding lymphnodes metastasis have been furnished in table XVII.

Metastatic foci were encountered in the bronchial lymphnodes and lungs in three instances on gross examination. The detailed observation pertaining to the individual animals has been appended separately.

In buffaloes and goats growth was generally slow, but it was massive. In buffaloes the frontal sinus and nasal passages were completely filled up with the tumour mass. In goats, the growth even protruded outside through the nostrils as fleshy mass.

10.2. Histopathological studies:

The histopathological examination of tissues collected from 36 tumour bearing animals were completed. An average of fifteen separate blocks were prepared from different portions of tumour tissue of each of the animals examined. The other organs like the liver, lungs, spleen, heart, kidney, pituitary, thyroid, adrenal and pancreas were also examined.

Lymphnodes of the head were subjected to detailed examination taking multiple blocks from each of the lymphnodes. Sections were routinely stained with Harris haematoxylin and eosin, Van-gieson's picro fuchsin, PAS, Mallory's trichrome unna's method for cledin and Gamori's retculin stain.

The histopathological features of tissues from individual animals have been given separately.

The tumours studied were classified as follows:

- | | |
|-------------------------------|----|
| 1. Squamous cell carcinoma | 15 |
| 2. Adenocarcinoma | 19 |
| 3. Undifferentiated carcinoma | 2 |

Adeno carcinoma was observed in nineteen animals. These were again grouped into simple adenocarcinoma (16) or papillary adenocarcinoma (3). There were well defined acini lined with low columnar epithelial cells or tall columnar cells. The acini contained mucinous secretory material. Foci of anaplastic cells without differentiation into acini were also encountered. Moderate number of mitotic figures were also evident. Cystic dilatation of acini were also seen. The stroma varied in proportion. Thin bands of fibrovascular stroma to thick wavy bands of fibrous stroma were evident. Fragments of bony tissue undergoing osteolysis was a consistent feature. They were seen encircled by islands of neoplastic tissue,

Adenocarcinomas often showed squamous metaplasia when multiple blocks and serial sections were examined. Transition from columnar to squamous cell type in focal areas was clearly evident. Intraepithelial hyalin formation was also a feature in these transformed cells. Once transition was evident, these were grouped as ϕ squamous cell carcinoma. The transitional feature in adenocarcinoma was recorded in 14 instances. The proliferating, columnar cells were seen arranged in pseudo alveolar pattern and towards the centre, they transformed into squamous cell type. Hyalinised foci were evident in the centre.

Squamous cell carcinoma consisted of well defined squamous epithelial cells arranged in groups with well formed concentrically laminated hyalin mass in the centre. Numerous cells in mitotic division were also evident. Non-keratinising squamous cell carcinoma were also encountered.

Undifferentiated carcinoma consisted of sheets of proliferating anaplastic cells. There was no indication of differentiation into either adenocarcinomatous or squamous cell carcinomatous type.

The stromal tissue in different types of tumours was of fibro-vascular type, But varied in proportion. There was no indication of neoplastic changes in the stroma.

~~Exxxxxxxxxxxxx~~ Osseous spicules encountered did not manifest any neoplastic characteristics. There was no indication to suggest an osseous metaplasia of the stroma. The bony spicules were only bones ~~under~~ undergoing osteolysis and rarefaction, secondary to tumour invasion.

The cellular response in the tumour tissue was poor. The cellular infiltrate consisted mainly of lymphocytes and macrophages. They were either nodular or diffuse in distribution. In vaccinated animals the cellular infiltrate in the tumour tissue was relatively more. Necrosis was pronounced in the vaccinated animals.

Tumour invasion often resulted in firm adhesion of the tumour tissue with the meninges. Diffuse invasion into the brain and formation of well defined groups of neoplastic tissue were evident in the brain parenchyma. There was compression of the neuropil but the reaction in the brain tissue was meagre. There was no stromal reaction. Diffuse gliosis and cerebral oedema were the common findings. Occasionally perivascular cuffing of glial cells was evident. Different parts of the brain were regularly examined, but metastatic foci were observed only in the cerebrum. Both gross and histological studies indicate that metastatic foci in the brain were the result of mechanical local invasion rather than haematogenous or lymphatic spread. It is also worthy to note that in spite of brain invasion by the tumour clinical nervous symptoms have been very little.

Head Lymphnodes:

The reaction in the lymphnodes were classified as:

1. Diffuse lymphoid hyperplasia in the paracortical zone.
2. Follicular hyperplasia and reactive germinal centres.
3. Pronounced sinus histiocytosis
4. Frank secondary malignant foci in the lymphnode.
5. Depletion of lymphoid follicles with diffuse lymphoid cell distribution and little amount of histiocytic reaction.

In the case of animals in which the tumour growth had not developed extensively and no secondaries had formed there was only diffuse lymphoid hyperplasia. But ^{in those cases where} where the growth was extensive, but still there was no metastasis there was follicular hyperplasia and reactive germinal centre formation. Pronounced sinus histiocytosis was a feature in malignant tumours where there was indication of invasion of certain neoplastic cells but still there was no frank evidence of metastasis. It would appear that there had been sufficient antigenic stimulation in the lymphnode. The secondary growths, only, in a few instances showed differentiation into squamous or columnar cells and formed epithelial pearls or acinar structures. There was histiocytic-macrophage reaction in these lymphnodes subsequent to metastatic growth. Stromal reaction was relatively poor. In certain instances the tumour growth had developed in the centre of the lymphoid follicles. The earliest indication of tumour metastasis was the presence of clumps of neoplastic cells in the subcapsular, sub-cortical lymphoid sinuses. The presence of neoplastic cells in the medullary region was only a late manifestation. Lymphatics often showed tumour emboli.

In the exhaustion stage, with advance tumour development and without frank metastasis there was depletion of lymphoid follicles with sparse distribution of lymphoid cells and little histiocytic reaction.

In 11 instances there was histological evidence of metastatic foci in the lymphnodes although there was no indication of metastasis on gross examination.

Formation of metastatic foci clearly showed malignant nature of the tumour growth. Metastatic foci in the pulmonary tissue was recorded in four animals. This was associated with lesions in the bronchial lymphnodes. The lesions in the lungs were multiple. In one instance there was well defined epithelial pearl formation. Stromal reaction in the pulmonary tissue was meagre. Bronchial lymphnodes revealed islands of neoplastic cells and histiocytic reaction. The other organs did not reveal any foci of tumour growth. The mode of spread of the tumour appear to be only by the lymphatic stream. There was no indication of a haematogenous spread.

11. ELECTRON MICROSCOPIC STUDIES:

Tumour tissue samples from nine tumour bearing animals were processed for electromicroscopic studies. The electromicrographs were studied to reveal the nature of tumour cells and to detect viral particles if any.

The proportion of euchromatin and heterochromatin varied in the nuclei which was abnormal in shape. The size of the nucleoli was large and nuclei contained many nucleola in most cases. The separation of fibrillary and granular components was indistinct. Many of the nuclei contained well defined prominent perinuclear cisternae. Moderate diffuse thickening of the nuclear membrane was noticed. The inner membrane of the nuclear envelope formed small vesicles in certain instances.

There was increase in the number of mitochondria in the cell. Tranverse and ring shaped cristae were noticed in certain instances while in certain others

there was complete disorganisation and dissolution of cristae. Mitochondria were swollen and granular. There was dissolution of the granules.

Well developed prominent endoplasmic reticulum was a common finding. In certain cases there was dilatation and vesiculation. The polyribosomes got dissociated and were seen scattered in the cytoplasm. The rough surfaced endoplasmic reticulum contained flocculent material. Golgi bodies were poorly developed. A few cells showed parallel arrays of cisternae in the cytoplasm.

Autophagolysosomes, containing remnants of ^{mitochondria} bacteria multivesicular bodies, glycogen particles and myeloid membranes were also observed.

SUMMARY

1. Eighty - three cases of tumour were recorded during the year 1979. This consisted of cattle (74 buffaloes (3) and goats (6). In all, during the last two years 176 cases were documented. The incidence was found to be more in cross-bred cattle. The most susceptible age group was 6-9 years. The youngest tumour bearing animal was aged three years.

2. Intermittent nasal discharge was found to be the earliest clinical manifestation. Epistaxis and nervous symptoms were only occasional symptoms. Unilateral exophthalmos was a common finding. Pregnancy was found to exacerbate the clinical symptoms in cows.

3. Anemia, reduction in plasma protein and moderate to severe leucocytosis were commonly seen. There was no variation in the ESR even in advanced cases of the tumour. There was an imbalance in the Serum calcium and phosphorous ratio particularly in animals with bone perforation.

4. Exfoliative cytological studies on the nasal discharge were found to be useful in the early diagnosis. Cytomorphological alterations were found to be characteristic. Animals in the early stages of tumour development could be detected by this technique.

5. Tracheotomy was found to be of help in alleviating the clinical symptoms and to prolong the survival time of the affected animals.

6. X-Ray was found to be ~~was~~ useful in the diagnosis of this condition.

7. Evaluation of the cerebrospinal fluid did not indicate any significant abnormality.

8. The immunological response of tumour bearing animals to purified tumour antigen and BCG was studied by I/D inoculation. Statistically significant difference in the response was not observed in tumour bearing animals when compared to healthy animals.

9. The studies on lymphnode reaction to tumour antigen and BCG indicated that in vaccinated animals tumour antigen was

was a better immunostimulant than BCG. In the non-vaccinated animals BCG was found to be a better immunostimulant.

10. The DNCB skin sensitisation test in cattle was standardised and perfected. This test was found to be of use in monitoring the immune response in cattle.

11. The functional activity of the macrophages was assessed by NBT test. There was indication of increased activity following immunomodulation.

12. The PHA skin sensitisation studies indicated that immunological competency of tumour bearing animals varied with the stage of tumour development.

13. The Agarose leukocyte migration inhibition test was used to monitor the immunological status of tumour bearing animals. Studies revealed that there is good scope for immunomodulation and immunotherapy could be attempted in early stages of the tumour growth.

14. As a non-specific immunotherapy BCG was found to be of use in early stages. Intralesional injection in low doses was found to be of value.

15. Specific immunotherapy was found to be useful in boosting the specific immune defence against tumour development.

16. Viral antibodies against Herpes Virus were not detectable in the serum of tumour bearing animals.

17. A few viral agents (STV:4, STV:15, STV:18, and STV:38) were isolated from the tumour tissue. These were ruled out to be New Castle Disease virus. These agglutinated human 'O' and guinea pig red cells. It was established that tumour bearing animals are excreting the virus in the nasal discharge. The isolates, STV:15 and STV: 38 were pathogenic to day-old chicks. Calves have been inoculated with STV 15 in the ethmoid region and they are under observation.

18. Bacteriological studies revealed that the tumour tissue was generally heavily contaminated with E.coli.

19. Tumour transplantation studies were attempted in both homologous and heterologous hosts with and without immunosuppression by different routes. There was no indication of tumour establishment.

20. Attempts to grow the tumour cells in tissue culture media did not succeed. There was establishment of growth but progressive growth was not obtained.

21. Electronmicroscopic studies revealed the epithelial character of the cells and malignant transformation. There was indication of the presence of viral particles in some of the cells.

22. The tumour was found to be malignant, although encapsulation was a feature. Metastatic foci were observed in the brain, draining lymphnodes of the head, bronchial lymphnodes and lungs. Besides blocking the nasal and pharyngeal passages, the tumour mass often invaded the brain tissue.

23. Histologically the tumours were classified as
1. Adenocarcinoma (19) 2. Squamous cell carcinoma (15) and (3). Undifferentiated carcinoma (2).


Transition of columnar cells to squamous cells were evident. Both non-keratinising and keratinising squamous cell carcinomas were encountered - papillary adenocarcinomas were also recorded.

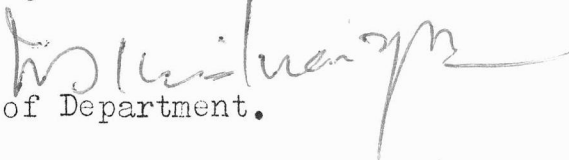
14. Results which can be exploited on pilot or field scale:

1. Early detection of the tumour is important and for this animals in the susceptible age group showing nasal discharge should be screened for neoplastic cells in the nasal discharge.
2. The tumour has been recorded in goats and as such goats also should be screened, if nasal discharge is noticed.
3. A pamphlet in Malayalam language has been prepared as a guide to farmers and Veterinarians giving detailed information on the tumour.

15. Publications:

1. Tumour of the paranasal sinuses in cattle. Dairy guide: 1:9.
 2. Incidence and Pathology of tumours of the mucosa of the ethmoid in goats. Indian J. Cancer.
 3. Thalyodarakalilai Cancer - Pamphlet in Malayalam Language KAU publication.
16. Contribution made by the co-operators.
17. Signature;


Professor of Pathology
(Project Officer)


Head of Department.

2/4/30 pcm

APPENDIX

Table I

Details of Animal^s Bearing Ethmoid Tumours
(Subjected to detailed investigation ~~studies~~)



Sl. No.	Date	Breed	Sex	Age	Source
1.	6-1-79	Cross bred	Female	8 years	Ayyanthol
2.	10-1-79	Cross bred	Female	10 years	Thottakad
3.	12-1-79	Cross bred	Female	9 years	Kunnamkulam
4.	20-1-79	Cross bred	Female	10 years	Puthyrangadi
5.	31-1-79	Non descript	Female	7 years	Vadakkackad
6.	4-2-79	Cross bred	Female	7 years	Kottakkal
7.	8-2-79	Non descript	Female	10 years	Thavanoor
8.	16-2-79	Goat	Female	12 years	Perumpadappu
9.	3-3-79	Cross bred	Female	10 years	Calicut 7
10.	8-3-79	Goat (H D)	Female	6 years	Kannachirakkal
11.	23-3-79	Cross bred Jersey	Female	9 years	Puthenvelikkara
12.	26-3-79	Cross bred	Female	10 years	Mannarcaud
13.	30-3-79	Cross bred	Female	11 years	Perumbavoor
14.	30-3-79	Jersey-Sindhi cross	Male	12 years	Thiruvizhamkunnu Livestock Farm
15.	8-4-79	Jersey	Male	10 years	Thandampara
16.	9-4-79	Cross bred	Female	6½ years	Kalamassery
17.	21-4-79	Non descript	Female	6 years	Sherthali
18.	26-4-79	Cross bred	Female	8 years	Livestock Farm, Mannuthy
19.	3-5-79	Cross bred	Female	8 years	Trichur
20.	24-5-79	Cross bred	Female	8 years	Vytilla
21.	24-5-79	Jersey	Male	10 years	Alwaye
22.	3-6-79	Cross bred Jersey	Female	8 years	Thrikkakara
23.	15-6-79	Cross bred	Female	9 years	Ayyanthol
24.	30-6-79	Cross bred	Female	8 years	Thodupuzha
25.	11-7-79	Cross bred	Female	5 years	Vollankallur
26.	17-7-79	Jersey sindhi cross	Female	6 years	Asokapuram

Sl. No.	Date	Breed	Sex	Age	Source
27.	19-7-79	Cross bred	Female	7 years	Thiruv ^a zhamkkunnu
28.	21-7-79	Cross bred	Female	8 years	Pandanisseri
29.	27-7-79	Cross bred	Female	7 years	Trichur
30.	1-8-79	Cross bred Jersey	Female	7 years	Velliyil
31.	1-8-79	Cross bred Jersey	Female	7 years	Thrikkakara
32.	2-8-79	Cross bred	Female	6 years	Varapuzha
33.	2-8-79	Buffalo	Female	7 years	Padalam
34.	5-8-79	Cross bred	Female	7 years	Etumanoor
35.	8-8-79	Cross bred	Female	7 years	Alwayo
36.	18-8-79	Cross bred	Male	10 years	Thiruvizhamkkunnu
37.	28-8-79	Cross bred	Female	8 years	Moorkanikkara
38.	20-9-79	Cross bred Jersey	Male	7 years	Pattambi
39.	24-9-79	Non descript	Female	8 years	Vaduthala
40.	24-9-79	Non descript	Female	8 years	Moovattupuzha
41.	29-9-79	Cross bred	Female	7 years	Karuvassery
42.	6-10-79	Goat	Female	7 years	Thripayar
43.	8-11-79	Goat	Female	6 years	Mukuthala
44.	7-12-79	Cross bred	Female	11 years	KAU, Mannuthy
45.	8-12-79	Buffalo	Female	7 years	Noyyar
46.	27-12-79	Cross bred	Female	7 years	Thycattusseri
47.	28-12-79	Cross bred	Female	10 years	Agathiyoor
48.	28-12-79	Non descript	Female	6 years	Perumpadappu

Table II

Details of Animals Bearing Ethmoid Tumour
(Report received from field Veterinary Surgeons)

Sl. No.	Date	Breed	Sex	Age	Source
1.	3-1-79	Goat	Female	8 years	Ramapuram
2.	5-1-79	Cross bred	Female	8 years	Kolahalamodu
3.	9-1-79	Cross bred	Female	7 years	Kanjirappally
4.	10-1-79	Non descript	Female	10 years	Pariyaram

Sl. No.	Date	Breed	Sex	Age	Source
5.	11-1-79	Non descript	Female	10 years	Thokkaackara
6.	12-1-79	Non descript	Female	8 years	Thycattussery
7.	15-1-79	Cross bred	Female	9 years	Cochin
8.	16-1-79	Non descript	Female	7 years	Kolahalamodu
9.	21-1-79	Non descript	Female	11 years	Changanacherry
10.	22-1-79	Non descript	Female	6 years	Sreemoolanagaram
11.	2-2-79	Cross bred	Female	8 years	Pangode
12.	13-2-79	Non descript	Male	8 years	Pangode
13.	4-3-79	Swiss brown	Female	6½ years	Tiruvalla
14.	17-3-79	Non descript	Female	10 years	Manarcaud
15.	2-4-79	Cross bred	Female	9 years	Udyogamandal
16.	4-4-79	Non descript	Male	7 years	Vytilla
17.	18-5-79	Non descript	Female	9 years	Sreckariyam
18.	13-6-79	Jersey cross	Male	6 years	Kanjirappally
19.	22-6-79	Buffalo	Female	7 years	Cannanore
20.	16-7-79	Non descript	Female	11 years	Kunnankulam
21.	17-7-79	Non descript	Female	9 years	Marangattapilly
22.	18-7-79	Jersey	Female	9 years	Nileswar
23.	28-7-79	Non descript	Female	6 years	Kalavoor
24.	1.8.79	Non descript	Female	10 years	Alwaye
25.	7-8-79	Jersey	Female	9 years	Angamaly
26.	14-9-79	Jersey	Female	4 years	Sutan Bathery
27.	25-10-79	Non descript	Female	2 years	Elamannoor
28.	28-10-79	Non descript	Female	7 years	Tirur
29.	31-10-79	Jersey	Female	7 years	Pattanacaud
30.	2-11-79	Non descript	Female	6 years	Calicut
31.	2-11-79	Non descript	Female	7 years	Ambalapuzha
32.	5-11-79	Goat	Female	6 years	Ettumanoor
33.	8-11-79	Cross bred	Female	7 years	Shortallay
34.	12-11-79	Non descript	Female	6 years	Pattanakad
35.	18-12-79	Non descript	Female	7 years	Alwaye

Table VII

SYMPTOMS MANIFESTED BY TUMOUR BEARING ANIMALS

Sl.No.	Animal No.	Exophthalmos			Age	Nasal discharge		Frontal bone perforation	Pregnancy
		Right	Left	Bilateral		Mucus	Blood		
1.	40	-	+	-	8 years	+	-	+	+
2.	41	-	+	-	10 years	+	-	-	+
3.	42	-	+	-	8 years	+	+	-	+
4.	43	-	+	-	10 years	+	-	+	+
5.	44	-	-	-	8 years	+	-	+	+
6.	45	-	+	-	12 years	+	-	-	-
7.	46	+	-	-	7 years	+	-	-	-
8.	47	-	+	-	14 years	+	+	-	-
9.	48	-	+	-	10 years	+	+	+	-
10.	49	-	+	-	12 years	+	-	+	-
11.	50	-	+	-	10 years	+	-	+	-
12.	51	-	+	-	6 years	+	-	+	-
13.	52	+	-	-	10 years	-	+	-	+
14.	53	+	-	-	9 years	+	-	-	+
15.	54	-	+	-	8 years	+	-	+	-
16.	55	-	+	-	11 years	+	-	-	-
17.	56	-	+	-	12 years	-	+	-	-
18.	57	-	+	-	8 years	+	-	-	-
19.	58	-	+	-	6½ years	+	-	-	-
20.	59	-	-	-	7 years	+	+	+	-

Sl. No.	Animal No.	Exophthalmos			Age	NASAL Discharge		Frontal bone perforation	Pregnancy
		Right	Left	Bilateral		Mucus	Blood		
21.	60	-	+	-	8 years	-	+	+	+
22.	61	-	+	-	8 years	+	+	-	-
23.	62	+	-	-	8 years	-	+	-	+
24.	63	-	-	-	9 $\frac{1}{2}$ years	+	-	-	-
25.	64	+	-	-	8 years	-	+	-	+
26.	66	-	+	-	8 years	+	+	-	-
27.	67	-	+	-	5 years	+	-	+	-
28.	68	+	-	-	8 years	+	-	-	-
29.	69	-	-	-	7 years	+	-	-	+
30.	70	-	-	-	8 years	+	+	-	-
31.	71	-	+	-	8 years	+	+	-	-
32.	72	+	-	-	7 years	+	-	-	-
33.	73	-	+	-	8 years	+	-	-	+
34.	74	-	-	-	9 years	+	-	-	+
35.	75	+	-	-	7 $\frac{1}{2}$ years	+	-	-	-
36.	76.	+	-	-	7 years	+	+	+	-
37.	77	-	+	-	8 years	+	-	-	-
38.	78	+	-	-	9 years	+	-	+	-
39.	80	-	+	-	7 years	+	+	-	-
40.	81	-	-	-	9 years	+	-	-	-
41.	82	-	-	-	8 years	-	+	-	-
42.	83	-	+	-	3 years	+	+	-	-

Sl. No.	Animal No.	Exophthalmos			Age	Nasal discharge		Frontal bone perforation	Pregnancy
		Right	Left	Bilateral		Mucus	blood		
43.	84	-	+	-	7 years	+	-	-	-
44.	86	+	-	-	7 years	+	-	-	-
45.	88	+	-	-	10 years	+	-	-	-
46.	89	-	-	+	10 years	+	-	+	-
47.	90	+	-	-	7 years	+	-	-	-
48.	91	+	-	-	7 years	+	+	-	+

Parotid lymphnodes : Congestion, moderate lymphoid hyperplasia

Retropharyngeal lymphnodes: Diffuse lymphoid hyperplasia
genus histiocytosis.

Mandibular lymphnodes: Congestion.

No: 42

Date of entry : 6.1.1979 Species: Bovine

Time: 11 A.M. - 1 P.M. Breed: Cross-bred Jersey

Date and time of death: Sex: Female

10 A.M. (Sacrificed 3.4.79) Colour: Brown

Age: 8 years.

Owner: St. Antony's Orphanage, Ayyanthol, Trichur.

Clinical History : Nasal discharge since last 4 months.
Had slight exophthalmos of the left eye
since last three months. Protrusion on the
forehead since last one month - Animal
pregnant - 5 months.

Gross lesions : Soft irregular mass of growth involving
the ethmoid region. The growth extended
into the left retrobulbar region and
filled up the nasal chamber and frontal
sinus. The tumour had perforated the
frontal bone and had extended into the
sub-cutaneous tissue. Retropharyngeal
lymphnodes moderately hyperaemic and
contained well defined greyish white growth -
Metastasis foci.

Histopathology : Tumour: Tall columnar and polyhedral cells
in groups. Thick fibrous stroma - Acini-
Dense mononuclear infiltration - degeneration
and necrosis - Focal areas showed squamous
metaplasia. Mononuclear and lymphoid
infiltration.

Diagnosis: SQUAMOUS CELL CARCINOMA.

Mandibular Lymphnodes: Depletion of lymphocytes in the cortical
region - Lymphoid hyperplasia in the
medullary region. Sinus histiocytosis.

Parotid Lymphnodes : Depletion of lymphocytes in follicles.
Marked histiocytic reaction. Congestion.

Retropharyngeal : Depletion of lymphoid follicles
Lymphnodes : Medullary fibrosis - Moderate histiocytosis.
Liver : Fatty change - necrosis, congestion
Heart : Sarcosporidiosis.
Kidney : Cystic dilatation of tubules.
Spleen : Atrophy - haemosiderosis.
Lung : Emphysema.

No: 44

Date of entry : 23.4.1979 Species : Bovine
Time : 10 A.M-12 Noon Breed : Cross bred
Date and time of death : 23.4.1979 morning Sex : Female Colour : Brown

Owner : Unnikrishnan Nambissar
Marath House, Kottapadi,
Kunnamkulam.

Age : Approximately 8 years.

Clinical History : Had slight intermittent nasal discharge since 6 months. Slight respiratory difficulty and snoring since two months. No exophthalmos. Pregnant 6 months.

Gross lesions : A large irregular encapsulated necrotic mass arising ~~filling the nasal passage~~ from the ethmoid and filling the nasal passage. The tumour tissue had perforated the frontal bone and had ~~involved~~ invaded into the subcutaneous tissue. Perforated the bony plate invaded into the brain. Adhesion with the meninges and cerebrum. Fleshy circumscribed growth in the retropharyngeal lymphnode.

Histopathology : Tumour: Acini of varying sizes lined by many layers of columnar epithelial cells. A few of the acini contained mucinous material. Many cells in mitotic division. Rarefied bony spicules - stroma moderate. Scattered mononuclear cell infiltration.

Diagnosis : ADENOCARCINOMA.

Heart : A few sarcocysts
Brain : Diffuse gliosis, congestion of capillaries.
Liver : Focal areas of fatty change.
Lung : Focal areas of emphysema
Kidney : No lesion
Spleen : Haemosiderosis - Thickened trabeculae
Retropharyngeal Lymphnodes : Slight paracortical hyperplasia
Mandibular lymphnodes : Depletion of lymphocytes in the follicles.
Moderate histiocytic reaction in the medulla.
Parotid lymphnodes: Depletion of lymphoid follicles.

No: 45.

Date of entry : 29.4.1979 Species : Bovine
Time : 10 A.M. - 11 A.M. Breed : Cross bred
Date and time of death : 29.4.1979 morning. Sex : Female
Owner : T.V.Velukutty, Puthiyangadi, Calicut - 5.
Colour : Brown Age : Approximately 12 years.
Clinical History : Intermittent nasal discharge since few months. Slight exophthalmos of the left eye since a month. The animal fell down and unable to get up since two weeks. Severe bed sores on the thigh and belly.
Gross lesions : An irregular fleshy mass of growth arising from the ethmo-turbinate region. The growth was moderately soft. Contained bony spicules - Retropharyngeal lymphnodes moderately hyperaemic.
Histopathology : Tumour: Sheetsof anaplastic tumour cells. Formed small acinar structures containing secretory material. Rarefied bony spicules - Numerous mitotic figures. Diffuse mononuclear infiltration.
Diagnosis: ADENOCARCINOMA

Kidney : Focal interstitial nephritis
Brain : Congestion
Liver : Congestion, focal areas of fatty change.
Spleen : Haemosiderosis
Lung : Emphysema
Mandibular lymphnodes : Depletion of lymphocytes in lymphoid follicles.
Slight histiocytic reaction in the medulla.
Retropharyngel : Numerous metastatic foci - Tumour cells
Lymphnodes embedded in the follicles - Moderate, sinus histiocytosis. Moderate stromal reaction.
Parotid lymphnodes: General lymphoid cell depletion slight histiocytic proliferation.

No: 47

Date of entry : 12.2.1979 Breed : Cross bred Jersey
Time : 8 A.M. to 10 A.M. Species : Bovine
Date and time of death: 12.2.1979 Sex: Female
7 A.M.
Owner : Kottakkal, Peoples Dairy, Near Ayurvedic Vaidysala, Kottakkal.
Age : 14 years.

Clinical History : Exophthalmos of the left eye since three weeks - Had intermittent nasal discharge and epistaxis - Given a course of anthiomaline - No response.

Gross lesions : Encapsulated growth arising from the mucosa of the ethmoid and extending into the nasal chambers. Dark brown growth contained scattered spicules of bone. Invaded the brain - Retropharyngeal lymphnodes contained encapsulated tumour growth - Many mitotic figures.

Histopathology : Tumour: Numerous acini of varying sizes columnar epithelial cells - Moderate fibrosis - Focal haemorrhage. Numerous mitotic figures.

Diagnosis : ADENOCARCINOMA

- Liver : Focal areas of fatty change
- Kidney : Tubular degeneration and necrosis - Focal areas of regenerative proliferation.
- Spleen : Atrophy and haemosiderosis.
- Heart : A few sarcocysts.
- Lungs : Areas of emphysema and collapse.
- Retropharyngeal lymphnodes : Diffuse lymphoid hyperplasia in the paracortical zone.
- Mandibular lymphnodes : Moderate lymphoid and histiocytic reaction.
- Parotid Lymphnode : Follicular hyperplasia - congestion.

No: 48

- Date of entry : 13.3.1979 Species : Bovine
- Time : 11 A.M.- 1 P.M. Breed : Cross bred
- Date and time of death : 13.3.1979
Early morning
- Sex : Female
- Owner : K.V.Mohammed, Kodukkatu Valappil, Vinparambu, Thavanoor.
- Age : 12 years.
- Clinical History : Respiratory difficulty since a month - Intermittant - Exophthalmos of the left eye - epistaxis since a fortnight. Nasal discharge since two months.
- Gross lesions : Had dark brown mass of growth - Bony spicules were seen in the tumour tissue. The growth had a smooth glistening capsule. The tumour tissue had invaded the cranium and has formed adhesion with the meninges. The frontal bone perforated and tumour projected out in the subcutaneous. The head lymphnodes were congested.
- Histopathology : Tumour: Squamous cells and large groups of undifferentiated cells - Numerous mitotic figures - Severe stromal reaction. Rarefied bones - Extensive haemorrhage.

Diagnosis : SQUAMOUS CELL CARCINOMA.

Kidney : Focal interstitial nephritis.

Brain : Congestion and diffuse gliosis.

~~Brain~~ : Metastatic foci - Acini lined by columnar cells and areas of squamous cells - Moderate gliosis.

Liver : Congestion. Mononuclear infiltration. in portal areas.

Spleen : Congestion, haemosiderosis

Heart : Sarcosporidiosis.

Parotid lymphnodes : Depletion of lymphoid cells.

Mandibular lymphnodes : Medullary fibrosis - congestion - oedema.

Retropharyngeal lymphnode : Congestion, focal areas of haemorrhage.

No: 49

Date of entry : 7.3.1979 Species : Caprine

Time : 10 A.M.-12 Noon

Date and time of death : 7.3.79 Sex : Female morning.

Owner : Sreedharan Master, Sree Bhavan, Parampad,
P.O.Purary, Perumpadappu, Malappuram.

Age : 12 years. Colour : Grey

Clinical History : Nasal discharge since two months - bulging of forehead, Exophthalmos of left eye. Keratitis, conjunctivitis since a month. A bulging on the forehead since 20 days.

Gross lesions : An encapsulated growth, fleshy in consistency. The growth perforated the frontal bone about 8 cm in diameter, bulged out into the subcutaneous tissue as a soft fleshy mass. The turbinates swollen had been destroyed and the pharynx had been blocked by the growth. Tumour invaded the cranium and was adherent to the meninges. The lymphnodes were moderately congested.

- Histopathology : Tumour: Undifferentiated cells ~~in~~ arranged in groups and contained areas which showed tendency to differentiate into squamous cells. Abundant stroma - numerous cells in mitotic division. Necrosis and mononuclear infiltration. Rarefied bony spicules.
- Diagnosis: SQUAMOUS CELL CARCINOMA.
- Heart : No lesions
- Brain : Metastatic foci - diffuse gliosis - cerebral oedema - congestion.
- Spleen : Depletion of lymphoid follicles.
- Liver : Severe fatty change - congestion
- Kidney : Focal tubular degeneration - Areas of calcification.
- Lymphnodes :
- Retropharyngeal Lymphnodes : Metastatic foci - atrophy of lymphoid follicles - sinus histiocytosis moderate.
- Mandibular lymphnode: Metastatic foci in the sub-cortical sinuses. Follicles replaced by tumour growth.
- Parotid lymphnodes : Lymphoid cell depletion in both the cortical and paracortical region.

No: 50

Date of entry : 1.5.1979 Species : Bovine
Time : 10 A.M. to 12 Noon Breed : Cross bred
Date and time of death : 1.5.1979 morning
Sex : Female Colour : Brown
Owner : E.Raghavan, Timber merchant, ~~xxx~~ Calicut - 7.
Age : 10 years.

Clinical History : Nasal discharge since two months. Had respiratory difficulty since two months. Slight exophthalmos of the left eye. Intermittent nasal discharge since 1½ months. A softened area about 5 cm. in diameter on the forehead since two weeks.

Gross lesions : A large fleshy encapsulated growth involving the ethmo turbinates and filling the frontal and maxillary sinuses. The bone has been perforated and comes at pharyngeal passage ^{blocked}. The head lymphnodes are hyperaemic and oedematus.

Histopathology : Tumour: Large sheets of proliferating squamous cells embedded in thick fibrous stroma. Bony spicules undergoing resorption. Moderate diffuse mononuclear infiltration. Numerous mitotic figures. No epithelial ~~xxxxxx~~ pearl formation.

Diagnosis: SQUAMOUS CELL CARCINOMA

Lung : Congestion and oedema.

Spleen : Congestion

Kidney : Degeneration of tubular epithelium

Brain : Oedema, diffuse gliosis.

Heart : No lesion

Spleen : Congestion

Retropharyngeal lymphnodes : Hyperplasia of paracortical region. Diffuse sinus histiocytosis.

Mandibular lymphnodes : Depletion of lymphocyte in follicles. Paracortical hyperplasia - Histiocytic reaction in the medulla.

Parotid lymphnodes: Diffuse lymphoid hyperplasia in the sinus. Atrophy of follicles.

No: 52

Date of entry : 31.3.1979 Species : Bovine

Time : 10 A.M. Breed : Cross bred Jersey

Date and time of death : 31.3.1979 Sex : Female

Owner : Anthony M.P., Mullavaikal Clrookcad, Kundukad.

Colour : Black Age : 10 years.

Clinical History : The animal had respiratory difficulty since 1½ months back. Right eye bulged, intermittent bloody discharge from the nostrils since a month. Animal pregnant 7 months.

- Gross lesions : Moderately hard growth containing bony spicules. Extends 2/3 into the nasal passage and partially invaded the pharynx. Encapsulated. Cut surface contained areas of necrosis. Retropharyngeal lymphnodes, enlarged, fleshy. Metastatic foci - other head lymphnodes slightly hyperaemic.
- Histopathology : Tumour Large sheets of undifferentiated epithelial cells with many cells in mitotic division. Focal areas of degeneration and necrosis. In certain areas cells differentiated into squamous cells. Moderate stromal reaction.
- Diagnosis: SQUAMOUS CELL CARCINOMA.
- Lung : Congestion, focal emphysema.
- Spleen : Depletion of lymphoid follicles. Haemosiderosis. Thick trabeculae sclerosed blood vessels.
- Heart : A few sarcocysts.
- Kidney : Focal areas of degeneration of tubules - Medullary congestion.
- Liver : Periportal fibrosis - fatty change - Mononuclear infiltration in partial areas.
- Brain : Congestion, diffuse gliosis, oedema.
- Bronchial lymphnodes : Metastatic foci in sub cortical sinuses - Histiocytosis in medullary region.
- Lymphnodes:
- Parotid lymphnodes : Islands of keratinised foci in the cortex.
- Retropharyngeal: Large area of metastatic foci in the node.
- Lymphnodes : Moderate histiocytosis.
- Mandibular lymphnodes : Metastatic foci in the lymphnode - Diffuse proliferation of lymphoid cells in the paracortical zone. Moderate sinus histiocytosis.

No: 54

- Date of entry : 24.4.1979 Species : Procine
- Time : 11 A.M. - 1 P.M. Breed : Cross bred
- Date and time of death: 24.4.79 Sex : Female
morning.
- Colour : Brown

Owner : P.V.Elias, Pazhayadathu, Mannarcaud, Kottayam.
Age : 8 years.
Clinical History : Had intermittent nasal discharge since four months. Respiratory difficulty since two months. Exophthalmos of the left eye and bulging of the right forehead since a month.
Gross lesions : Moderately soft mass of growth - arising from the ethmoid region - invaded the pharynx, cranial cavity, adhesion with the meninges - perforated the frontal bone - Turbinates were completely destroyed Head lymphnodes moderately hyperaemic.
Histopathology : Tumour: Large sheets of undifferentiated cell type - Rarefied spicules of bone - cells in mitotic divisions - Mononuclear infiltration - stroma sparse.
Diagnosis : UNDIFFERENTIATED CARCINOMA.
Spleen : Depletion of lymphoid follicles - Thickened trabeculae.
Liver : Periportal fibrosis - Bile duct hyperplasia - congestion.
Heart : Sarcocysts.
Kidney : Focal haemorrhage in the medullary region.
Brain : Oedema
Lung : Oedema, mononuclear infiltration in the interstitial tissue.
Parotid lymphnodes : Diffuse lymphoid hyperplasia.
Retropharyngeal lymphnodes : Follicular hyperplasia - Moderate sinus histiocytosis.
Mandibular lymphnodes : ~~X~~ Congestion.

No: 55

Date of entry : 9.4.79 Species : Bovine
Time : 11 A.M. Breed : Cross-bred
Date and time of death : 9.4.79 Sex : Female

~~Case~~ : Narayana Swami, Miyal Madom, Ayyappa Temple Road,
Perumbavoor.

Age : 11 years.

Clinical History : Had nasal discharge since 2½ months.
Respiratory distress since two months.
bulging of left eye since a month.
Conducted operation to remove the tumour
mass.

Gross lesions : A cauliflower like growth involving the
ethmoid region and extending into the
nasal passage, pharynx and left &
retrobulbar region - invaded into the
cranial cavity adhesion with the meninges,
oedema and congestion of the nasal mucosa.
Retropharyngeal lymphnodes, moderately
enlarged - Metastatic foci. The other
head lymphnodes congested.

Histopathology : Tumour: Proliferating squamous epithelial
cells formed epithelial pearls - Moderate
stroma. Mononuclear infiltration in the
stroma. Areas of haemorrhage and necrosis.

Diagnosis : SQUAMOUS CELL CARCINOMA.

Brain : Foci of neoplastic cells - congestion, oedema.

Spleen : Congestion, haemosiderosis

Kidney : Focal areas of tubular degeneration and
necrosis - glomerular congestion

Liver : Fatty change - congestion

Heart : A few sarcocysts.

Parotid lymphnodes : Congestion, Moderate sinus histiocytosis.

Mandibular lymphnodes: Metastatic foci - Depletion of lymphoid
follicles.

Retropharyngeal
Lymphnodes : Extensive metastatic foci - differentiation
into squamous cells.

No: 56

Date of entry : 30.3.79 Species : Bovine

Time : 2 P.M. - 5 P.M. Breed : Jersey/Sindhi

Date and time of death : 30.3.79 1.30 P.M.

Sex : Male

Owner : Livestock Research Station, Thiruvazhamkundu.

Colour: Brown Age : 12 years.

Clinical History : Had slight nasal discharge since a month.
Intermittent epistaxis since 2 weeks.
Pronounced exophthalmos since a week.
Exophthalmos of the left eye since a fortnight.
Keratitis and conjunctivitis of left eye.

Gross lesions : A large moderately hard mass of growth involving the ethmoid and extending into the left nasal passage destroying turbinates - Extended into the pharynx and left retrobulbar region. Retropharyngeal lymphnodes on the left side enlarged to the size of an orange, contained encapsulated mass of growth about 2 cm, in diameter - Metastatic focus.

Histopathology : Tumour: Sheets of anaplastic cells formed islands of differentiated squamous cells with keratinisation. Moderate fibrous stroma. Rarefied bony spicules. Foci of mononuclear infiltration.

Diagnosis : SQUAMOUS CELL CARCINOMA.

Kidney : Areas of tubular degeneration, necrosis and hyaline casts.

Spleen : Depletion of lymphoid cells - congestion haemosiderosis.

Brain : Congestion and oedema.

Heart : No lesion

Lung : Emphysema

Liver : Congestion - Telangiectasis, fatty change.

Lymphnodes :

Mandibular lymphnodes : Moderate sinus histiocytosis.

Parotid lymphnodes : Diffuse lymphoid hyperplasia. Marked sinus histiocytosis. Metastatic foci.

- Parotid lymphnodes : Massive metastatic growth-tumour cells in lymphoid follicle.
- Mandibular lymphnodes : Islands of neoplastic cells in sub cortical zone. Diffuse lymphoid hyperplasia.

No: 58

- Date of entry : 12.11.79 Species : Bovine
Date : 12.11.79 Breed :
Time : 10 A.M. Sex : Female
Date and time of death : 12.11.79 Colour : Black with white patches.

Owner : Bridget Convent, Kalamassery. Age: 6½ years.

Clinical History : The animal had dyspnoea since two months and mucus discharges from the nostrils, exophthalmos of the left eye since a month.

Gross lesions : An encapsulated, moderately hard mass of growth filled the nasal sinus. The tumour growth extended into the left retrobulbar region. Invaded the cranial bone and formed adhesion with the meninges - compressed the cerebrum. Head lymphnodes moderately hyperaemic.

Histopathology : Tumour: Sheets of proliferating squamous epithelial cells forming well defined epithelial pearls in focal areas. Intraepithelial hyaline. Rarefied bony spicules. Congestion and haemorrhage.

Diagnosis : KERATINISING SQUAMOUS CELL CARCINOMA.

- Heart : No lesions.
- Lung : Emphysema.
- Liver : Congestion - Telangiectasis
- Kidney : Congestion
- Spleen : Haemosiderosis - Depletion of lymphoid tissue.
- Brain : No lesions.
- Retropharyngeal lymphnodes : Diffuse paracortical lymphoid hyperplasia
Sinus histiocytosis.

Parotid lymphnodes : Lymphoid cell depletion in cortex and medulla. Moderate stromal fibrosis.
Mandibular lymphnodes : Follicular atrophy - Hyperplasia of stromal tissue.

No: 59

Date of entry : 4.5.79 Species : Bovine
Time : 11 A.M. - 1 P.M. Breed : Cross bred
Date and time of death : 4.5.79 10 A.M. Sex : Female
Owner : Karumban K., Kochuceliyl Magithira, Sherthali.

Age : 7 years Colour : Brown

Clinical History : Had respiratory difficulty since 2 months. Intermittent nasal discharge and bleeding from nostrils since a month.

Gross lesions : A dark brown dense growth, containing many bony spicules - Frontal bone perforated over an area of 3 cm. Turbinates were destroyed - Retropharyngeal lymphnodes on the left side enlarged, fleshy - Metastatic foci.

Histopathology : Tumour: Groups of acini lined by tall columnar epithelial cells - severe stromal reaction - Many mitotic figures - Rarefied bony spicules - Mononuclear infiltration.

Diagnosis: ADENOCARCINOMA

Liver : Fatty change - congestion

Spleen : Atrophy - haemosiderosis

Lung : Congestion and oedema

Heart : A few sarcocysts.

Kidney : Focal areas of tubular degeneration.

Lymphnodes:

Mandibular lymphnodes : Diffuse histiocytosis - haemosiderosis

Retropharyngeal lymphnodes : Diffuse lymphoid hyperplasia - congestion.

No: 60

Date of entry : 11.6.79 Species : Bovine
Time : 11 A.M. - 1 P.M. Breed : Cross bred Jersey
Date and time of death : 11.6.79 Sex : Female
Owner : University Livestock Farm, Mannuthy.
Colour : Brown Age : Approximately 8 years.

Clinical History : Had intermittent nasal discharge since 3 months. Slight respiratory difficulty since 2 months. Exophthalmos of the left eye since 2 months. Bulging of the forehead - since a month. Pregnant - full term.

Gross lesions : A large irregular fleshy mass of growth arising from the ethmoid and protruding into the nasal chambers, frontal and maxillary sinus. Frontal bone, perforated over an area of 10 cm. and tumour bulged at. Tumour invaded into the cranial cavity and formed adhesion with the brain and meninges. Head lymphnodes moderately enlarged.

Histopathology : Tumour: Anaplastic cells - Many cells in mitotic division - Columnar cells in certain areas undergoing metaplasia. Mononuclear infiltration in stroma. Rarefied bony spicules.

Diagnosis: SQUAMOUS CELLS CARCINOMA.

Liver : Congestion

Heart : A few sarcocysts.

Lung : Broncho - pneumonia

Spleen : Atrophy of lymphoid tissue.

Lymphnodes:

Retropharyngeal lymphnode : Moderate histiocytosis. Follicles hyperplastic.

Mandibular lymphnode : Lymphoid hyperplasia in the cortical and paracortical region.

Parotid lymphnodes : Diffuse lymphoid hyperplasia in the cortical and paracortical zones.

No: 61

Date of entry : 25.5.79 Species : Bovine
Time : 11.30 A.M. Breed : Cross bred
Date and time of death : 25.5.79 Sex : Female
Owner : Sukumaran, Naduvil House, Mission Quarters, Trichur.
Colour : Brown Age :
Clinical History : Nasal discharge since two months.
Exophthalmos of left eye since a month.
Intermittent epistaxis.
Gross lesions : Moderately fleshy mass of growth -
extending from the turbinate mucosa to
about 1/3 of the nasal passage. Invaded
brain adhesion with the meninges. Extended
into the left retrobulbar region.
Metastatic foci in the retropharyngeal
lymphnodes.
Histopathology : Tumour: Acini of varying sizes - contained
secretory material - columnar epithelium -
sparse amount of stroma - Rarefied thin
bony spicules. Diffuse mononuclear
infiltration.
Diagnosis : ADENOCARCINOMA
Liver : Congestion - Telangiectasis - Mononuclear
infiltration in portal areas.
Kidney : Tubular degeneration and necrosis. Foci
of mononuclear infiltration.
Lung : Oedema and emphysema
Heart : Few Sarcocysts.
Spleen : Congestion
Brain : Congestion and diffuse gliosis.
Retropharyngeal lymphnodes : Follicular atrophy - sinus histiocytosis -
Paracortical lymphoid hyperplasia.
Parotid lymphnodes : Follicular atrophy - Moderate sinus
histiocytosis.
Mandibular lymphnodes. : Diffuse lymphoid hyperplasia of paracortical
region - congestion.

No:62

Date of entry : 2.7.79 Species : Bovine
Time : 10 A.M. Breed : Cross bred
Date and time of death: 10 A.M. 2.7.79 Sex : Female
Owner : Peoples Dairy, Vytilla Colour : Brown
Age : 8 years.
Clinical History : Exophthalmos of the right eye, intermittent nasal bleeding and respiratory distress since a month. Tracheotomy was conducted. Pregnant full term.
Gross lesions : A hard dark brown mass of growth contained scattered bony spicules - Extended into the nasal passage, pharynx and right retrobulbar region. Head lymphnodes slightly hyperaemic.
Histopathology : Tumour: Polyhedral cells - Numerous cells in mitotic division -- Formed acini-Focal areas showed metaplasia into squamous cells - Rarefied bone - slight mononuclear infiltration Focal areas of necrosis.
Diagnosis : SQUAMOUS CELL CARCINOMA
Brain : Diffuse gliosis - satellitosis - congestion.
Kidney : Fatty change - congestion.
Heart : A few sarcocysts.
Lung : Broncho-pneumonia
Spleen : Atrophy.
Retropharyngeal lymphnodes : Paracortical lymphoid hyperplasia - moderate sinus histiocytosis.
Mandibular lymphnodes : Lympho-follicular hyperplasia. Marked sinus histiocytosis.
Parotid lymphnodes: Lymphoid follicular hyperplasia with germinal centre formation. Marked sinus histiocytosis.

No: 64

Date of entry : 20.6.79 Species : Bovine
Time : 8 A.M. - 11 A.M. Breed : Cross bred

Date and time of death : 20.6.79 Sex : Female
Owner : Sacred Heart Seminary, Thrikkakara, Edappally.
Colour : Brown Age : Approximately 8 years.

Clinical History : Slight respiratory distress since 2 months. Intermittent epistaxis, exophthalmos of the right eye since a month, gradually increasing. Frontal swelling near the right eye, operated a week back, the turbinates. Extended into the right retrobulbar region. The growth contained numerous bony spicules. Retropharyngeal lymphnodes moderately enlarged and fleshy-Metastatic foci.

Histopathology : Tumour: Tall columnar epithelial cells forming acini of varying sizes. Cystic dilatation of a few. Numerous mitotic figures. Focal and diffuse mononuclear infiltration. Bony fragments undergoing osteolysis - Areas of degeneration and necrosis.

Diagnosis : ADENOCARCINOMA.

Liver : Congestion, areas of fatty change.
Kidney : Degeneration and desquamation of the tubular epithelial cells. Focal areas of medullary haemorrhage.
Heart : Congestion
Brain : Diffuse gliosis - satellitosis - oedema
Spleen : Atrophy of lymphoid follicles
Lung : Emphysema
Retropharyngeal lymphnodes : Cortical lymphoid cell depletion, lymphoid and histiocytic hyperplasia in the sinuses.
Mandibular lymphnodes : Follicular hyperplasia - congestion.
Parotid lymphnodes : Atrophic lymphoid follicles - Thick medullary stroma - Moderate histiocytic reaction.

No:66

Date of entry : 30.6.79 Species : Bovine
Time : 10 A.M.-11 A.M. Breed : Cross bred

Date and time of death : 30.6.79 evening

Sex : Female Colour : Grey

Owner : Kalarikkal Tottyil Mathew, Anjoni, Thekkumbayani, Thodupuzha.

Age : Approximately 8 years.

Clinical History : Had intermittent nasal discharge since 3 months. Epistaxis intermittent since two months. Slight bulging of the right eye and severe respiratory distress since a month.

Gross lesions : A large irregular mass of growth involved the frontal sinus and extended into the pharynx and lower third of the nasal passage destroying the turbinates. Invaded into the right retrobulbar region. The growth contained numerous bony spicules. Retropharyngeal lymphnodes moderately enlarged and fleshy. Metastatic foci.

Histopathology : Tumour: Tall columnar epithelial cells forming acini of varying sizes. Cystic dilatation of a few. Numerous mitotic figures. Focal and diffuse mononuclear infiltration. Bony fragments undergoing osteolysis. Areas of degeneration and necrosis.

Diagnosis: ADENOCARCINOMA

Liver : Congestion. Areas of fatty change.

Kidney : Degeneration and desquamation of the tubular epithelial cells. Focal areas of medullary haemorrhage.

Heart : Congestion

Brain : Diffuse gliosis - satellitosis - oedema

Spleen : Atrophy of lymphoid follicles

Lung : Emphysema

Retropharyngeal lymphnodes : Cortical lymphoid depletion - lymphoid and histiocytic hyperplasia in the sinuses.

Mandibular lymphnodes : Follicular hyperplasia - congestion

Parotid lymphnodes : Atrophic lymphoid follicles. Thick medullary stroma - Moderate histiocytic reaction.

No: 67

Date of entry : 11.8.79 Species : Bovine
Time : 1 P.M. Breed : Jersey cross
Date and time of death : 10 A.M. on 11.8.79
Sex : Female Colour : Brown
Owner : K.V.Chandran, Chappali Veedu, Thumbur, Vellankallur.
Age : 5 years.

Clinical History : Animal had severe respiratory distress and also mucous discharge from nostrils since 1½ months. Exophthalmos of the right eye and slight bulging of the forehead on right side.

Gross lesions : A large ~~growth~~ fleshy pale yellow growth, filled the frontal and maxillary sinuses and extended into the pharynx and brain. Focal areas cystic nature - Frontal bone on the right side perforated over an area of 4 cm. Growth bulged out No invasion into the cranium. Head lymphnodes slightly hyperaemic.

Histopathology : Tumour: Sheets of epithelial cells isolated by moderately thick bands of stroma. Moderate number of mitotic figures. Focal areas of necrosis and haemorrhage.

Diagnosis: Undifferentiated CARCINOMA.

Liver : Congestion - Diffuse fatty change and necrosis.

Spleen : Congestion - haemosiderosis. Thickening of trabeculae.

Lung : Emphysema, focal bronchitis.

Kidney : Focal areas of medullary haemorrhage

Heart : No lesions

Retropharyngeal lymphnodes : Diffuse lymphoid hyperplasia

Parotid lymphnodes: Depletion of lymphocytes in the medullary sinus. Congestion.

Mandibular lymphnodes : Congestion.

No: 68

Date of entry : 6.10.79 Species : Bovine
Time : 11 A.M. Breed : Cross-bred
Date and time of death : 6.10.79 noon Sex : Female
Owner : V.Kuttappan, Nedumparambil House, Gandhi Nagar Dairy,
Ashokapuram, Alwaye.
Colour : Brown Age : 8 years.
Clinical History : Had respiratory distress since two months.
Slight nasal discharge - mucous mixed.
Exophthalmos of the left eye since three
weeks. Did tracheotomy on 20.7.79.
Gross lesions : A large soft irregular fleshy mass of growth
filling the nasal and frontal sinuses.
The growth contained many necrotic foci -
Extended into the pharyngeal passage.
Head lymphnodes moderately enlarged and
hyperaemic.
Histopathology : Tumour: Tall columnar epithelial cells
formed acini of varying size. Cystic
dilatation in focal areas. Numerous
mitotic figures - Focal and diffuse mono-
nuclear infiltration - Bony fragments
undergoing osteolysis. Areas of degeneration
and necrosis.
Diagnosis: ADENOCARCINOMA.
Liver : Diffuse congestion - Areas of fatty change.
Kidney : Degeneration and desquamation of the tubular
epithelium. Focal areas of medullary
haemorrhage.
Heart : Congestion
Brain : Diffuse gliosis
Spleen : Atrophy of lymphoid follicles.
Parotid lymphnodes : Moderate diffuse lymphoid hyperplasia.
Mandibular lymphnodes: Diffuse lymphoid hyperplasia.
Retropharyngeal lymphnodes : Moderate histiocytosis, atrophy of lymphoid
follicles.

No: 72

Date of entry : 3.8.79 Species : Bovine

Time : 2 P.M. - 4 P.M. Breed : Cross bred
Date and time of death : 3.8.79 Sex : Female
Owner : Kalavoor Kamalakshy, Punnambithra, Velliyil, North Angadi.
Colour: Brown Age : 7 years.

Clinical History : Slight nasal discharge since 1½ months. Going down in condition. Respiratory difficulty since a month. Blind on both eyes since a fortnight. Calved twice. Slight bulging of the left eye since a fortnight.

Gross lesions : A large fleshy mass of growth, arising from the ethmoid fills up the nasal passage destroying the ethmo-turbinates - invaded cranium, adhesion with the meninges and cerebrum. All the head lymphnodes are enlarged to the size of a lemon - Metastatic foci.

Histopathology : Tumour: Large groups of anaplastic epithelial cells separated by thin bands of stroma. Rarefied bony spicules - Diffuse lymphoid cell infiltration. In certain areas cells showed differentiation into squamous cells.

Diagnosis: SQUAMOUS CELL CARCINOMA

Liver : Congestion
Kidney : Congestion, tubular degeneration
Heart : A few sarcocysts
Spleen : Haemosiderosis, thickened trabeculae.
Brain : Oedema.

Retropharyngeal lymphnodes : Metastatic foci - Differentiated squamous cell carcinoma. Focal areas of necrosis.
Mandibular lymphnodes : Depletion of lymphocytes in the follicles.
Parotid lymphnodes : Necrosis of the follicles - Depletion of lymphocytes.

No: 73
Date of entry : 7.9.79 Species : Bovine

Time : 4 P.M. -- 6 P.M. Breed : Cross-bred Jersey

Date and time of death : 7.9.79 x 4 P.M. Sex : Female

Owner : Sacred Heart Study House, (Seminary), Thrikkara.

Colour : Brown Age : Approximately 8 years.

Clinical History : Having slight intermittent nasal discharge since two months. Respiratory difficulty since 1½ months. Exophthalmos of the right eye since a month. Three months pregnant.

Gross lesions : A large irregular soft mass of growth arising from the ethmoid and extending into the frontal and maxillary sinus. Focal areas showed brown patchy areas of necrosis. Nodular growth adherent to the turbinate scrolls. Posteriorly extends into the brain causing adhesion with the meninges, compression of cerebrum. Mandibular and retropharyngeal lymphnodes, enlarged and fleshy - metastatic growth.

Histopathology : Tumour: Acini of varying sizes lined by columnar cells. Tumour tissue thrown into papillary folds. Moderate stromal reaction. Rarefied bony spicules - Focal areas of haemorrhage and mononuclear infiltration.

Diagnosis: PAPILLARY ADENOCARCINOMA

Brain : Congestion - Metastatic foci - oedema

Lung : Emphysema

Spleen : Depletion of lymphoid follicles - severe haemosiderosis.

Kidney : Congestion - dilatation of tubules - calcification - hyaline casts.

Liver : Congestion

Parotid lymphnodes : Lymphoid hyperplasia in the cortical and paracortical region.

Retropharyngeal lymphnodes : Follicular atrophy - Diffuse lymphoid hyperplasia in the ~~xxxxxxxxxxxxx~~ paracortical region.

Mandibular lymphnodes : Depletion of lymphoid cells in the follicular region. Lymphoid hyperplasia in the paracortical and medullary region.

No:77

Date of entry : 12.8.79 Species : Bovine
Time : 11 A.M. Breed : Cross-bred Jersey
Date and time of death : 12.8.79 Colour : Brown
Owner : St. Joseph Pontifical seminary Carmalgiri, Alwaye.
Sex: Female Age : 8 years.

Clinical History : Nasal discharge since four months.
Respiratory distress was noticed since
2 months. Right eye bulged - Going down
in condition - Blind on right side.

Gross lesions : An irregular moderately fleshy growth
extending from the ethmoid region into
the nasal passage and pharynx and right
retrobulbar region. Invaded cranium
formed adhesion with the meninges and
compressed cerebrum. Head lymphnodes
moderately hyperaemic.

Histopathology : Tumour: Proliferating sheets of epithelium
and in focal areas tall columnar cells
forming groups of acini. Acini contained
mucinous secretion. Osseous spicules
undergoing osteolysis-stroma scanty -
scattered mononuclear infiltration.

Diagnosis : ADENOCARCINOMA

Lung : Congestion, focal oedema

Heart : No lesions

Kidney : Focal areas of tubular degeneration

Liver : Focal areas of degeneration and necrosis
congestion.

Spleen : Severe haemosiderosis, depletion of lymphoid
follicles thickening of trabeculae.

Brain : Moderate oedema.

Retropharyngeal lymphnodes : Diffuse hyperplasia of lymphoid tissue in
the cortical and medullary region.
Depletion of lymphocytes in the follicles.
Dense medullary stroma.

Parotid lymphnodes : Diffuse hyperplasia in the cortical region.
Depletion of cells in lymphoid
follicles-slight sinus histiocytosis.

Mandibular lymphnodes : Follicular atrophy on the cortex -
Slight histiocytosis in the medulla.

No:78

Date of entry : 1.9.1979 Species : Bovine
Time : 11 A.M. - 1 P.M. Breed : Brown Swiss cross
Date and time of death: 1.9.79 Sex : Male
Owner : Thiruvizhankunnu Livestock Farm.
Colour : Grey Age : Approximately 9 years.

Clinical History : Had respiratory distress and nasal discharge since two months. Intermittent nasal discharge pronounced exophthalmos of the left eye. Bulging of the forehead since one month.

Gross lesions : Fleshy, encapsulated mass of growth filling the frontal sinus and extending into the pharynx, 1/3 rd of the nasal passage and into the maxillary sinus - perforation of frontal bone about 10 cm diameter. Growth bulges out into the sub-cutaneous tissue - invaded brain formed adhesion with meninges.
Retropharyngeal and parotid lymphnodes enlarged - lemon sized and fleshy -

Histopathology : Tumour: Cuboidal and columnar epithelial cells arranged in acinar pattern. Acini contained secretory material. In certain places the proliferating cells arranged in tall irregular papillary structures. Abundant loose, fibrous tissue stroma - Rarefied bony spicules - Focal areas of haemorrhage, necrosis.

Diagnosis: PAPILLARY ADENOCARCINOMA

Heart : No lesion
Spleen : Depletion of lymphoid follicles - congestion
Kidney : Focal areas of tubular degeneration and necrosis.
Liver : Focal areas of congestion and haemorrhage - Telangiectasis.
Lung : Emphysema
Parotid lymphnodes : Diffuse proliferation of lymphocytes in the follicles and paracortical region.

Mandibular lymphnodes : Diffuse lymphoid hyperplasia. Moderate sinus histiocytosis.

Retropharyngeal lymphnodes : Diffuse lymphoid hyperplasia.

No: 80

Date of entry : 25.9.79 Species : Bovine

Time : 3 P.M. Breed : Non-descript

Date and time of death: 25.9.79 at 2 P.M. Sex : Female

Owner : P.A.Raghavan, Panikkassery, Moorkanikkara, Kozhukully.

Colour : Light brown Age : 8 years.

Clinical History : Nasal discharge and slight respiratory distress since 2 months. Right eye slightly bulged. Bloody mucous discharge from the nostrils occasionaly.

Gross lesions : Soft brownish grey mass of growth, filled the nasal chambers and invaded right retro-bulbar region. Invaded the cranial cavity formed adhesion with the meninges and compressed the cerebrum. Head lymphnodes hyperaemic.

Histopathology : Tumour: Proliferating columnar cells formed acini - stroma moderate - Mononuclear infiltration in focal areas. Acini contained secretory material.

Diagnosis : ADENOCARCINOMA

Liver : Fatty change and focal areas of necrosis

Spleen : Atrophy of lymphoid tissue

Heart : A few sarcocysts.

Lungs : Emphysema

Brain : Diffuse gliosis and oedema

Kidney : Congestion

Parotid lymphnodes : Metastatic foci

Mandibular lymphnodes: Paracortical lymphoid hyperplasia

Retropharyngeal lymphnodes : Sinus histiocytosis, congestion.

No:88

Date of entry : 17.12.79 Species : Caprine
Time : Morning Breed : Malabari cross
Date and time of death : 17.12.79 Sex : Female
Owner : Smt.Padnavathy, Kothupurath Veedu, Mukuthala.
Colour : Black and white Age : 6 years

Clinical History : Had slight nasal discharge since two months. Respiratory difficulty since one and a half months. Bulging of the left eye since a month. Bulging of the forehead since two weeks.

Gross lesions : A soft brownish grey fleshy mass of growth arising from the ethmoid and extends into the nasal chambers - encapsulated - invaded into the brain - Head lymphnodes oedematous.

Histopathology : Tumour: Anaplastic cells separated by thin stroma - Focal areas showed differentiation into acini lined by columnar cells. Rarefied bone - mononuclear infiltration - necrosis and haemorrhage.

Diagnosis : ADENOCARCINOMA

Kidney : Focal areas of medullary haemorrhage

Brain : Cerebral oedema

Heart : No changes

Lung : Emphysema

Mandibular lymphnodes : Lymph-follicular hyperplasia - depletion of cells in the paracortical zone.

Retropharyngeal lymphnodes : Congestion - Depletion of lymphoid cells in the cortex and medulla.

Parotid lymphnodes : Lymphoid hyperplasia in the cortex - congestion.

No: 90

Date of entry : 7.12.79 Species : Bovine
Time : 3 P.M. Breed : Non-descript buffalo

Date and time of death : 7.12.79 Sex : Female

Owner : Open Prison, Neyyar, Trivandrum.

Colour : Black Age : 7 years.

Clinical History : Nasal discharge occasionally since two months. Animal developed severe respiratory distress since a month. Left side forehead bulging. Exophthalmos of the left eye.

Gross lesions : An irregular fleshy growth arising from the ethmoid region filled the frontal sinus - Bulged out into the subcutaneous tissue of the forehead - Extended into the pharynx, left retrobulbar region causing exophthalmos of the left eye - invaded into the brain and adhered with the meninges. Compression of the cerebrum.

Histopathology : Tumour: Numerous acini of varying sizes. Tall columnar epithelial cells - scanty stroma - Focal areas of congestion. Rarefied bony spicules.

Diagnosis: ADENOCARCINOMA

Heart : A few sarcocysts

Liver : Congestion, fatty change and necrosis

Lung : Emphysema

Spleen : No lesions

Brain : Islands of acini embedded in the parenchyma. Congestion, Diffuse gliosis - satellitosis.

Parotid lymphnodes : Depletion of lymphoid cells - congestion.

Mandibular lymphnodes : Moderate sinus histiocytosis.

Retropharyngeal lymphnodes : Paracortical hyperplasia.

No: 91

Date of entry : 28.12.79 Species : Bovine

Time : 11 A.M.-1 P.M. Breed : Cross bred Jersey

Date and time of death: 28.12.79 Sex : Female

Owner: Capt.A.P.George, Puthen Veettil, Paayil, Thycattusseri.

Age : 7 years.

- Clinical History : Had slight nasal discharge since 3 months. Intermittent epistaxis. Exophthalmos of the left eye since 1½ months, right eye bulging since 20 days. Thick viscid nasal discharge. 5 months pregnant.
- Gross lesions : An irregular hard mass of growth extending from the ethmoid region into the frontal sinus. It extended into the pharynx and retrobulbar region - Invaded the cranial cavity, formed adhesion with the cerebrum. Forehead showed a bulging mass - parotid and retropharyngeal lymphnodes enlarged and fleshy - Metastatic.
- Histopathology : Tumour: Proliferating columnar cells formed acini of varying size. Formed papillary folds in certain areas. Moderately thick bands of stroma - Bony spicules undergoing osteolysis - Scattered mononuclear infiltration - Focal areas of degeneration and necrosis.
- Diagnosis: ADENOCARCINOMA
- Spleen : Severe congestion - atrophy of lymphoid tissue - Thick trabeculae.
- Kidney : Tubular degeneration and necrosis.
- Liver : Diffuse fatty change - Focal telangiectasis
- Heart : Few sarcocysts
- Brain : Congestion, oedema, scattered gliast nodular formation - satellitosis.
- Retropharyngeal lymphnodes : Groups of neoplastic cells in the cortical sinuses. Depletion of lymphoid cells in the cortex, Lymphoid histiocytic reaction in the medulla.
- Parotid lymphnodes : Follicular atrophy - Hyperplasia of paracortical zone - moderate histiocytosis - small islands of neoplastic cells in medullary zone.
- Mandibular lymphnodes: Diffuse lymphoid hyperplasia in both cortex and medulla - Paracortical hyperplasia - more pronounced.

Nb: 53

Date of entry : 5.4.79 Species : Bovine
Time : 11 A.M. Breed : Cross bred Jersey

Date and time of death : 5.4.79 Sex : Female

Owner : Joseph Techil, Kuthiathode, Chavadyil House,
P.O. Puthenvelikkara.

Colour : Brown

Age : 9 years.

Clinical History : Had slight nasal discharge since two months.
Exophthalmos of the right eye since one
month - Respiratory distress since a month -
pregnant - 5 months.

Gross lesions : A large irregular fleshy mass of growth
arising from the ethmoid and invading into
the nasal passage - perforated the frontal
bone - Growth extended into the left
retrobulbar region - Bony spicules embedded
in the tumour tissue.

Histopathology : Tumour Scattered islands of acini containing
secretion. A few cells in mitotic division.
Proliferating cells without differentiation
in acini. Thin stroma - focal areas of
degeneration, necrosis, haemorrhage.

Diagnosis : ADENOCARCINOMA

Liver : Congestion

Heart : No lesion

Spleen : Haemosiderosis - Depletion of lymphoid cells.

Lung : Congestion and oedema.

Kidney : Focal interstitial nephritis

Brain : No lesions

Parotid lymphnodes : Congestion

Retropharyngeal lymphnodes : Moderate histiocytosis, congestion, diffuse
lymphoid hyperplasia.

Mandibular lymphnode : Diffuse lymphoid hyperplasia.

No: 40

Date of entry : 5.1.79 Species : Bovine

Time : 1 P.M. - 2 P.M. Breed : Cross bred

Date and time of death : 5.1.79 Sex : Female

Owner : Thanikudam, K.Mohan Das, Karict House, Kurchikkara.

Colour : Brown Age : 7 years.

Clinical History : Had respiratory distress and slight nasal discharge since a month. The animal calved 6 days back. Slight exophthalmos of the left eye. Going down in condition. Tracheotomy done.

Gross lesions : An irregular soft fleshy mass of growth filling frontal and maxillary sinus. The growth extended into the nasal passage and destroyed the turbinates perforated the cranial bone and the tumour invaded the cranium and caused adhesion with the meninges. The frontal bones were intact. Lower portion of the tumour tissue showed small foci of suppuration, Head lymphnodes were moderately oedematous.

Histopathology : Tumour: Proliferating undifferentiated epithelial cells forming glandular acini in certain areas. The cells lining the acini are low columnar. Acini contained secretions. Stroma moderate. Focal areas of necrosis. Suppuration - Rarefied bony spicules.

Diagnosis : ADENOCARCINOMA

Liver : Focal areas of fatty change - congestion.

Spleen : Congestion

Heart : A few sarcocysts

Kidney : Congestion

Brain : Islands of acinar tissue embedded in the cerebrum. Moderate gliosis, congestion and oedema.

Parotid lymphnodes : Diffuse lymphoid hyperplasia

Retropharyngeal lymphnode : Moderate sinus histiocytosis

Mandibular lymphnodes: Congestion. Diffuse lymphoid hyperplasia.

No: 70

Date of entry : 28.11.79 Species : Bovine

Time : 9 A.M.-11 A.M. Breed : Cross bred

Date and time of death : 28.11.79 Sex : Female
morning

Owner : P.Balan Nair, Pullakkar House, Kaniyaram, P.O.Pananisseri,
Kunnankulam.

Colour : Brown Age : 8 years.

- Clinical History : Had nasal discharge since 3 months -
Intermittent epistaxis since a month -
Respiratory difficulty since a month
No exophthalmos.
- Gross lesions : A large irregular fleshy mass of growth
arising from the ethmoid region and loosely
hanging down and fills up the nasal
passage - No bone perforation -
encapsulated growth.
- Histopathology : Tumour: Large sheets of squamous epithelial
cells - A few cells in mitotic division -
Moderately thick bands of fibro-vascular
stroma - scattered mononuclear infiltration.
- Diagnosis: SQUAMOUS CELL CARCINOMA
- Liver : Congestion
- Spleen : Haemosiderosis. Thick trabeculae
- Kidney : Congestion
- Heart : A few sarcocysts
- Brain : Oedema and congestion
- Parotid lymphnodes : Moderate congestion
- Retropharyngeal lymphnodes : Diffuse histiocytosis
- Mandibular lymphnodes : Follicular hyperplasia

No: 43

- Date of entry : 1.2.79 Species : Bovine
- Time : 10 A.M. Breed : Cross-bred
- Date and time of death : 1.2.79 Sex : Female

Owner : St. Antony's Orphanage, Trichur.

Colour : Brown Age : 10 years

- Clinical History : Animal going down in condition - Had
four calvings - Nasal discharge since
4 months. Left eye bulged since 2
months - Animal pregnant 4 months.
- Gross lesions : A large irregular moderately soft mass
arising from the ethmoid region and
extending into the nasal passage -
exophthalmos of the left eye. Pharynx
partially blocked. Head lymphnodes
moderately hyperemic.

Histopathology : Not completed

No: 51

Date of entry : 18.3.1979 Species : Caprine

Time : 10 A.M. - 11 A.M.

Breed : Cross bred Malabari

Date and time of death : 18.3.1979 morning Sex : Female

Owner : Subhadramma, Mettuladithadan, Monnamachirckkal,
P.O. Vengeri, Nadaparambu.

Colour : Grey Age : Approximately 7 6 years.

Clinical History : Had respiratory distress since two months. Slight exophthalmos of the left eye since one month. A bulging of the forehead since 15 days. Softening of the bone ~~bone~~ between eyes. Intermittent nasal discharge since 3 months. Thick nasal discharge since a week.

Gross lesions : A large fleshy mass of growth arising from the ethmoid and growing into the nasal passage destroying the ethmo-turbinates. Invaded the cranium formed adhesion with the meninges and cerebrum. The frontal bone perforated over an area of 10 cm and the growth protruded out. Extended into the left retrobulbar region. Retropharyngeal lymphnodes enlarged contained metastatic foci.

Histopathology : Not completed.

No: 63

Date of entry : 7.7.1979 Species : Bovine

Time : 10 A.M.-1 P.M. Breed : Jersey

Date and time of death : 7.7.79, 8 A.M.

Sex : Male (Ganesh) Colour : Brown

Owner : ICDE, Always Age : 9 1/2 years.

Clinical History : Had respiratory distress since a month. Slight nasal discharge since 3 weeks. No exophthalmos. Pressing the head against walls, intermittent fits since 3 weeks.

Gross lesions : Large irregular encapsulated hard mass (2 kg) involving the ethmoid and filling the frontal and maxillary sinuses. Extended into the nasal passage destroying the turbinates - Invaded cranium formed adhesion with meninges and compressed cerebrum. The growth contained bony spicules and was encapsulated.

Histopathology : Not completed.

No: 74

Date : 30.9.79 Species : Bovine
Time : 10 A.M. Breed : Cross bred
Date and time of death: 1.10.79 9 A.M. Sex : Female
Owner : George Joseph, Mandam Neevi Kode, Varapuzha.
Age : 7½ years Colour : Brown

Clinical History : Animal had severe respiratory distress since a month. Mucous discharge from the nostrils since 3 months. Left eye bulged since a fortnight. Animal was going down in condition since a month.

Gross lesions : Tumour growth completely filled the nasal sinuses and part of it extended into the pharynx, left retrobulbar region. Many foci of suppuration in the fleshy growth.

Histopathology : Not completed.

No: 76

Date of entry : 21.9.79 Species : Bovine
Time : 10 A.M. Breed : Cross bred
Date and time of death: 21.9.79 Sex : Female
Owner : P.G.Gopalan Nair, Narikuzhiyil, Avanur, Ettunanoor.
Colour : Black Age : 7 years.

Clinical History : The animal had respiratory distress since 3 months, and occasional bloody mucous discharge through nostrils. Left eye bulging. Slight bulging of fore head since a fort night.

Gross lesions : Moderately hard, reddish mass of growth with scattered irregular bony spicules. The growth filled up the nasal sinuses and invaded the left orbital region. Perforation of the frontal bone, tumour bulged out into the subcutaneous tissue. Haemorrhagic patches in the tumour tissue. Retropharyngeal lymphnode contained whitish masses of metastatic growth.

Histopathology : Not completed.

No: 75

Date : 26.8.79 Species : Bovine

Time : 11.30 A.M. Sex : Female

Date and time of death: 26.8.79 11 A.M.

Colour : Black

Owner : T.O.Thomas, Thettalakode house, Padalam, Udyogamanda.

Age : 7½ years.

Clinical History : Animal had severe respiratory distress since a month. Mucous discharge from the nostrils since 3 months. Left eye bulged since a fortnight. Animal was going down in condition since a month.

Gross lesions : Tumour growth completely filled the nasal sinuses and part of it extended into the pharynx, left retrobulbar region. Many foci of suppuration in the fleshy growth.

Histopathology : Not completed

No: 81

Date : 21.11.79 Species : Bovine

Time : 8 A.M. 11 A.M. Breed : Graded Sindhi

Date and time of death: 21.11.79 Sex : Male (Bullock)
Sacrificed VPH.

Owner : Rice research station, Pattambi. Colour : Brown

Age : Approximately 9 years.

Clinical History : Had intermittent nasal discharge since 2 months. Slight respiratory difficulty since 1½ months. No exophthalmos.

Gross lesions : A large irregular fleshy mass of growth arising from the ethmoid and extending anteriorly into the nasal passages - destroying the nasal turbinates - Fills the posterior third. The surface of the growth is soft and granular and deeper portions firm, greyish white. Head lymphnodes moderately oedematous.

Histopathology : Not completed.

No:82

Date of entry : 6.1.79 Species : Bovine
Time : 10 A.M. Breed : Cross bred Jersey
Date and time of death: 6.1.79 morning Sex : Female

Owner : C.P.Abdul Rahimankutty, Chembukattil, Vaduthala, Kochannur.

Colour : Grey Brown Age : 8 years

Clinical History : Dyspnoea, intermittent epistaxis since 1½ months. Swelling on frontal region since a fortnight. No exophthalmos - The animal calved on 4.1.79.

Gross lesions : An irregular reddish hard mass. The growth was hard, dark brown. Frontal bone rarefied perforated the cribriform plate of the ethmoid entered the brain and formed adhesion with the ~~xx~~ meninges.

Histopathology : Not completed.

No: 83

Date of entry : 6.1.79 Species : Bovine
Time : 4 P.M. Breed : Non descript

Date and time of death: 6.11.79 4 P.M. Sex : Female

Owner : V.A.Mohamed, Velliathurkudi, Kununkara, Muvattupuzha.

Colour : Grey Age : 8 years.

Clinical History : Animal had dyspnoea, nasal discharge and intermittent epistaxis since two months. Exophthalmos of the right eye.

Gross lesions : A large irregular moderately fleshy growth filled the nasal chambers, frontal and maxillary sinus. The growth contained cystic spaces. Extended into the pharynx and right retrobulbar region - Formed adhesion with the meninges. Multiple areas of necrosis

Histopathology : Not completed.

No: 84

Date of entry : 6.10.79 Species : Bovine
Time : 11 A.M. Breed : Non-descript
Date and time of death: 6.10.79 noon Colour : Black and brown
Owner : T.P.Sathyabhama, Lakshi Malayam, Karuvassery, Calicut.
Sex : Female Age : 7 years.

Clinical History : The animal had slight nasal discharge since a month, going down in condition, slight exophthalmos of the right eye. Had two deliveries, respiratory difficulty since two weeks, circling occasionally.

Gross lesions : A moderately soft mass of growth arising from the ethmoid and extended into the nasal passage partially destroying the turbinates - Filled the frontal sinus and blocked the pharynx. Invaded cranial cavity and caused adhesion with the meninges. The retropharyngeal lymphnodes, enlarged, fleshy - metastatic foci.

Histopathology : Not completed.

No: 86

Date of entry : 18.10.79 Species : Caprine
Time : 11 A.M. Breed : Malabari
Date and time of death: 18.10.79 10 A.M. Sex : ♀ Female
Owner : Saleem P, Puthiyaveetil, Thriprayar.
Colour : Black and white Age : 7 years.

Clinical History : Animal going down in condition, respiratory distress since a month, slight nasal discharge and exophthalmos of left eye - bulging of the forehead since a fortnight.

Gross lesions : An irregular soft mass of growth almost filled the 3/4th of the nasal chambers. Growth capsulated, soft, with scattered necrotic and purulent foci. Turbinates had been distorted and destroyed.

Histopathology : Not completed.

No: 89

Date of entry : 7.12.1979 Species : Bovine

Time : 9 A.M. Breed : Cross bred Jersey

Date and time of death: Sex : Female

Owner : KAU Livestock Farm, Mannuthy

Colour : Red Age : 10 years

Clinical History : Respiratory difficulty and nasal discharge since two months. Both eyes bulging since two weeks. On 6.12.79 early morning the animal fell down and showed fits and was unable to stand.

Gross lesions : The growth fleshy, arising from the ethmoid region and extended into the nasal and retrobulbar region-invaded into the brain. Adhesion with the meninges - compression of the cerebrum. The mass extended towards the forehead perforating the frontal bone. The growth contained embedded bony spicules. The retropharyngeal lymphnodes enlarged to the size of a tennis ball - Metastatic foci.

Histopathology : Not completed.

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