

T.C.

-3

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ONAY SAYFASI



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Sağlık Bilimleri Enstitüsü Müdür V.

Doktora Tezi standartlarına uygun bulunmuştur.



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Patoloji Anabilim Dalı Başkanı

Tez tarafımızdan okunmuş, kapsam ve kalite yönünden Doktora Tezi olarak kabul edilmiştir.

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fibrozis (ok). x20, HE.		63
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HE	64
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KISALTMALAR

ABC-P	: Avidin Biotin Kompleks Peroksidaz
AGID	: Test
BALT	: - Bronchus Associated Lymphoid Tissue
CIEF	: Counter Immun Elektroforezis
ELISA	: Enzyme-Linked Immunosorbent Assay
F	:
FAT	: Floresans Antikor Testi
H	: Hemaglutinin Protein
HE	: Hematoksilen-Eosin
HI	:
HN	: Hemaglutinasyon-
IFAT	:
L	: Large Protein
M	: Membran Protein
N	:
P	: Polymerase Associated Protein
PBS	: Phosphate Buffer Solution
PI3	: Parainfluenza Tip 3
PPR	: - Peste des Petits Virus
RSV	: Respiratorik Sinsityal Virus
RT-PCR	: Reverse Transcriptase Polymerase Chain Reaction

1.

ile

antijenlerinin tespiti, ha

-

2391 adet

;

suppuratif (n=71, %13.44), intersitisyel (n=367, %69.50),

3 ve Respiratorik Sinsityal Virus

tijenleri belirlenirken,

rol oynayan

etiyojik ajanlardan oldukla

Anahtar Kelimeler:

2. ABSTRACT

HISTOPATHOLOGICAL AND IMMUNOHISTOCHEMICAL INVESTIGATIONS ON PESTE DES PETITS RUMINANTS, PARAINFLUENZA TYPE 3 AND RESPIRATORY SYNCYTIAL VIRUS ASSOCIATED PNEUMONIAS IN SHEEP IN ELAZIG REGION

The aims of this study were to detect the prevalence of Peste des Petits Ruminants, Parainfluenza Type 3 and Respiratory Syncytial Virus antigens in ovine pneumonias in Elazig by mean of immunohistochemistry, to determine seasonal distribution of these diseases, and to investigate gross and microscopic characteristics of these viruses. With this aim, total of 2391 sheep slaughtered in a slaughterhouse in Elazig between January-December of 2011 were investigated and pneumonia was detected in 568 (23.75%) animals macroscopically. Histological examination, revealed that 528 (22.08%) samples were pneumonias while 40 were detected as blood aspiration. Microscopically these cases were classified as fibrinous (n=44, 8.33%), suppurative (n=71, 13.44%), interstitial (n=367, 69.50%), verminous (n=27, 5.11%), and pulmonary adenomatosis (n=19, 3.59%). Total of 482 pneumonic lungs, not including verminous and pulmonary adenomatosis, immunohistochemical staining method was used in order to investigate the viral antigens of Peste des Petits Ruminants, Parainfluenza Type 3 and Respiratory Syncytial Virus. In immunohistochemical staining no Peste des Petits Ruminants antigen was seen while Parainfluenza Type 3 and Respiratory Syncytial Virus antigens were detected as 6.63% (n=32) and 0.82% (n=4), respectively. In conclusion, Parainfluenza Type 3 and Respiratory Syncytial Virus antigens were detected as important etiologic agents in ovine pneumonias Elazig.

Keywords: Immunohistochemistry, Parainfluenza Type 3, Peste des Petits Ruminants, Pneumonia, Respiratory Syncytial Virus, Sheep

yararlanma kabiliyetlerinin

791 120

ise

lan

parazitler bakteriler, viruslar, mantarlar,

yasal

3.1. Koyunlard

Solunum ile a
n bu viruslar yerek ya da bakterilerin

mikroskobik olarak

inter r
suppuratif veya

Koyun adenovirus tip 2, 5, p 2, reovirus tip 1,
herpesvirus tip 1

nedeniretrovirus ve maedi-visna hasta

lentivirus ise
(14).

3.2.

3.2.1. Etiyoloji

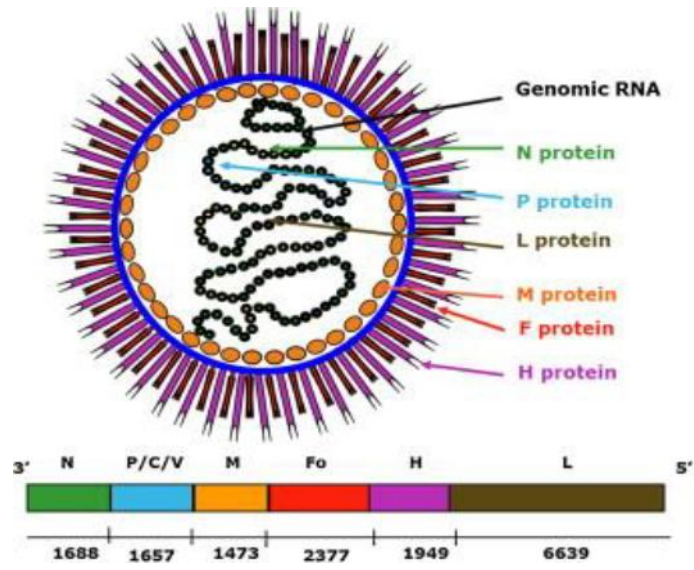
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peplomer

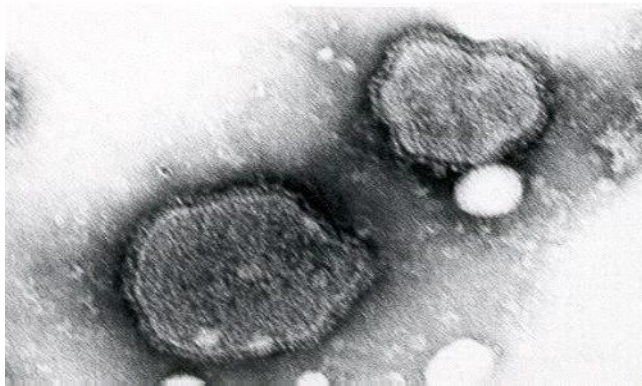
n

polymerase associated protein (

-



. Morbilli

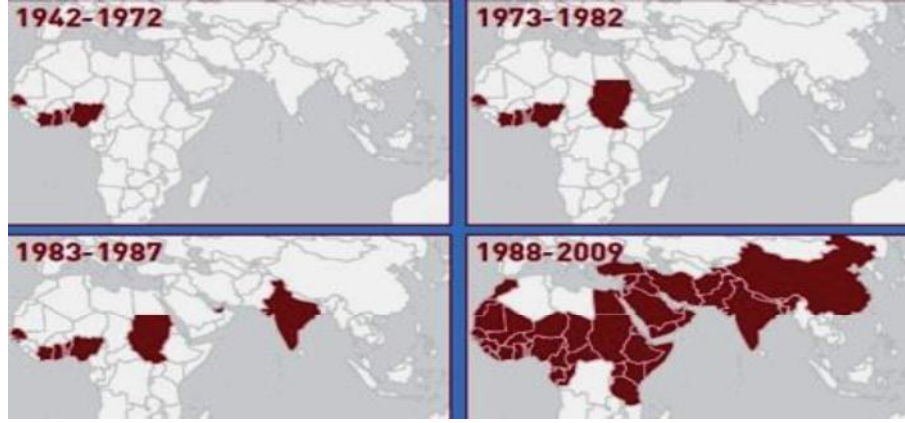


3.2.2. Epidemiyoloji

Arap

26, 27, 28, 29),

32)



(35).

enfeksiyonu serolojik olarak Enzyme-Linked Immunosorbent Assay (ELISA) ile
koyunlarda n

tir (39).

3.2.3. Patogenez

heamolytica

Mannheimia

e sinus ve farenks mukoza epitel

- riyodu sonunda

solunum sistemini enfekte eder (44).

3.2.4. Klinik Bulgular

ilerde klinik olarak perakut, akut ve subklinik olmak

genellikle 3-

Perakut n,

konstipasyon g

(24).

Akut form klinik olarak

3-

-41,2

-

Subklinik formda be

.

(23).

3.2.5. Makroskopik Bulgular

karakterize konsolide ve atelektazik alanlar

).

gelir (43, 44, 46, 48).

3.2.6. Mikroskopik Bulgular

karakterizedir (49).

in

kirdeklerinde piknoz - karyoreksiz

alve

-

a sitoplazmik, nadiren

veya

testi (AGID)

(52, 53), counter immun elektroforezis

polymerase chain reaction (RT-PCR) (20, 57), floresans antikor testi (FAT) (58)

ve immunperoksidaz (59) gibi metodlarla direkt olarak dokudan

kulla

3.3. Parainfluenza Tip 3

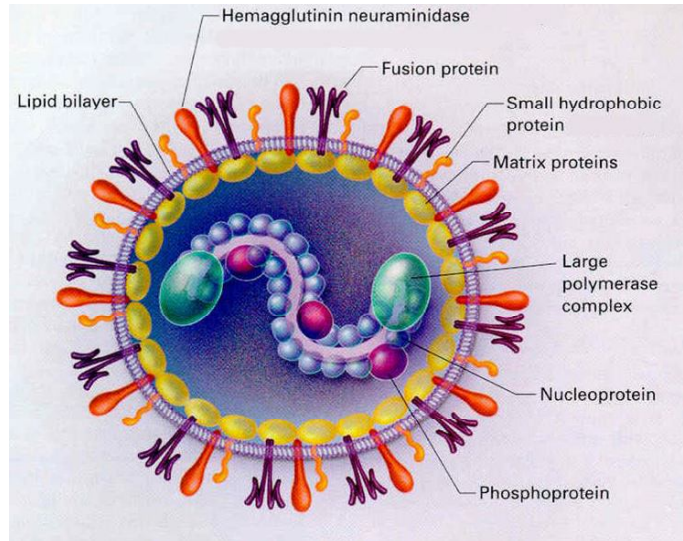
3.3.1. Etiyoloji

-

r. Bu iki protein virusun yakla

(62, 63).

-300



(64).



5

).

3.3.2. Epidemiyoloji

). Virus



. PI3 virus

).

). Van

).Urfa

).

antijenleri).

3.3.3. Patogenez

76, 77, 78, 79). Yap

bufalo, geyik, ked

,

81, 82, 83, 84).

b

87, 88

M. heamolytica ile birlikte izole edilir

(89). PI3

epitelin

(90

(88).

3.3.4. Klinik Bulgular

genellikle subklinik seyreder. *M. haemolytica*

PI3 salgır (92, 93). -

mortalite %6-8

). Deneysel enfeksiyonlarda klinik bulgular 4- en
)

3.3.5. Makroskopik Bulgular

-

-

kahv

atelektazik a). Soluk borusu yoluyla PI3 virusu

-

mor r (96).

3.3.6. Mikroskopik Bulgular

kci

r amfizem, hafif

-

elere ve nekrotik

). Asidofilik

cisimciklerine bazen de alveo

). Enfeksiyondan

sonraki 7-

). Alveollerde

6, 63, 100).

viral antijenlere

sitoplazmik

enindeki eksudatta, alveollerde ve makrofajlarda

). Genel olarak

ral antijenler tespit edilir (102).

PI3 vir

), komplement fiksasyon (82),

FAT (104), HI (105) ve ELISA (106

3.4. Respiratorik Sinsityal Virus

3.4.1. Etiyoloji

RSV, Paramyxoviridae ailesi

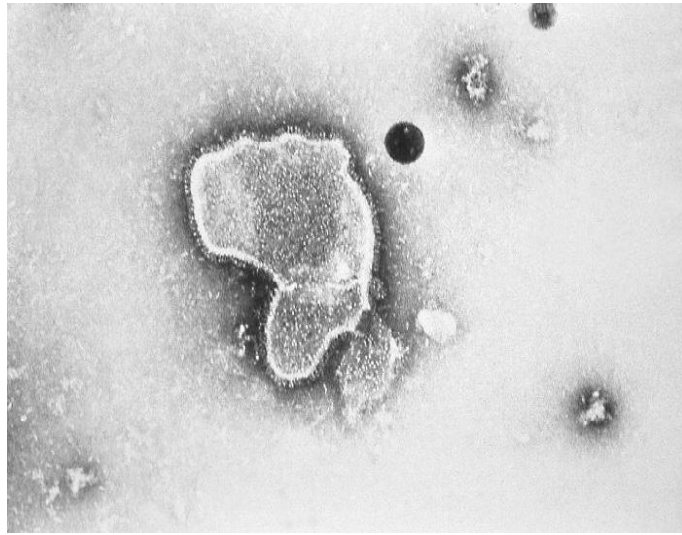
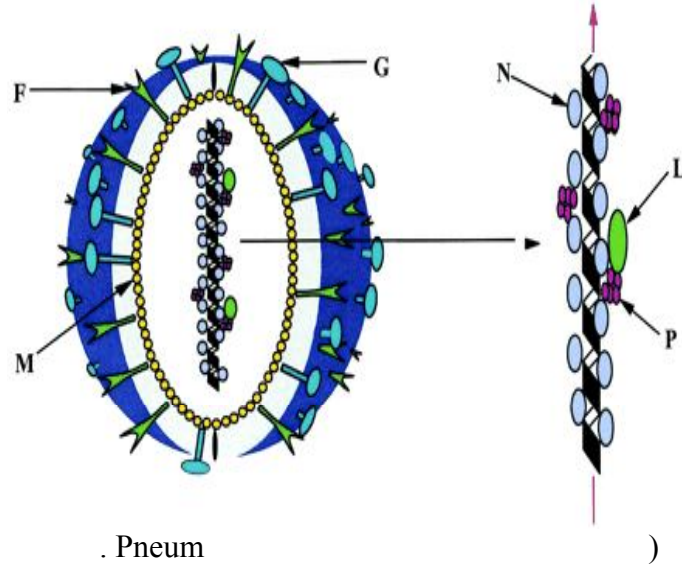
segmentsiz negatif sarma

). Pneumovirus

irion

-500 nanometre

(108).

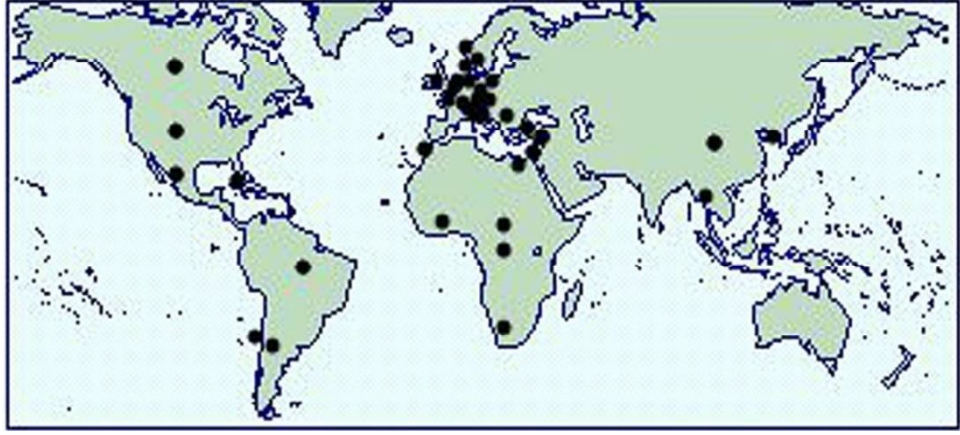


8

3.4.2. Epidemiyoloji

RSV

(98, 104, 110).



).

(112). RSV

(74).

(72

immunohistokimyasal olarak RS

).

3.4.3. Patogenez

). RSV

ne yem ve su ile

k tablosu

-

danalar

moniyeye neden olabilmektedir (115).

3.4.4. Klinik Bulgular

si gibi

). Koyunlarda deneysel RSV enfeksiyonunda klinik

M. haemolytica gibi bakteriyel bir etkenle birlikte

).

3.4.5. Makroskopik Bulgular

Makr

da birbiriyle

lokalize konsolide alanlar tespit edilir. Atelektazik ve konsolide alanlardaki

etkenler

lenerek,

puratif kar

).

3.4.6. Mikroskopik Bulgular

).

Karakteristik bulgu asidofilik

alveol epite

if

kimyasal olarak viral antijenlerin

viral antijenle).

3.4.

), immunoperoksidaz, FAT ve ELISA
(114) gibi metodla
A, indirekt immunofloresans (108), indirekt
hemaglutinasyon (98

3.5. PPR, PI3 ve RSV Enfeks

kene maruz kalmada hem humoral hem de
immun
r).
Koyunlarda PI3 virus enfeksiyonu
(63, 87
ben). RSV enfeksiyonu
).
). RSV ile persiste
enfekte, ati
).

4.

4.1.1. Hayvan Materyali

-

-

4.2.1. Makroskopik

;

hacminin %10-

-50

iyodorsal,

kraniyoventral, aksesuar, kaudadorsal ve kauda

4.2.2.1. Histopatolojik

e

polylisiinli lamlara a

lin-

131).

mikroskobunda (Nikon Ni-E) incelendi.

4.2.2.2.

vidin Biotin Kompleks Peroksidaz (ABC-P) metodu

ile T lenfosit

esel i

Tablo 1.

boyamada

Rabbit anti-rinderpest (Poliklonal antikor)		1:1000
Mouse anti-PI3 (Monoklonal antikor)	Biox (Jemelle-Bio290	1:50
Mouse anti-BRSV (Monoklonal antikor)	Biox (Jemelle-Bio031	1:50
Rabbit anti-human CD3 (Monoklonal antikor)	Lab Vision (Fremont, CA, ABD) RM-9107-S0	1:150
Anti-Polyvalent HRP/DAB (Universal Kit)	Lab Vision (Fremont, CA, ABD) TP-015-HD	

Serum kontrol olarak primer antikor

Tablo 2.

Etken	Doku	Temin Yeri
PPR		PCR
PI3		Bornova Veteriner Kontrol PCR
RSV		
CD3		-

Sonra Endojen peroksidaz
aktivitesin nemli $2O_2$
dokular 2 x 5 dk. phosphate buffer solution (PBS) ile
,
, 0.05% Tween 20, pH 6.0) uygul

edildi. Protei

Daha sonra kesitler
muamele edildi -

-diaminobenzidine (DAB) ile muamele edildi. Son olarak,

lamel

Anti-rinderpest, anti-PI3 ve anti-

boyamalarda skorlama

-

immunopozitif h

. Anti-CD3 antikoru ile

•

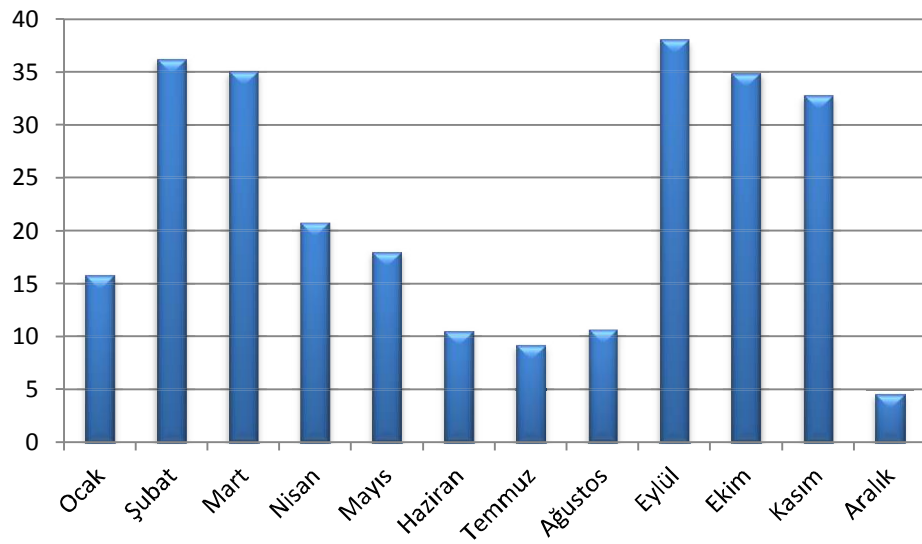
-

5. BULGULAR

5.1. Makroskobik Bulgular

568
erin
ise
P
-20 lere
- ol

mevsimin



Makroskobik

aylara

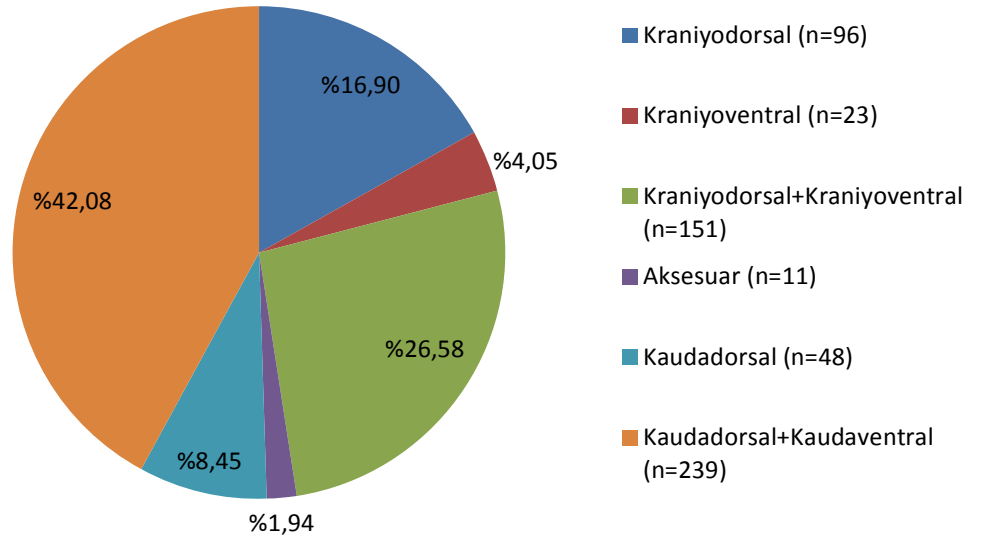
Tablo 3.

	Ocak		Mart	Nisan		Haziran	Temmuz		Ekim				Toplam	%
Muayene	171	397	234	227	217	267	141	113	218	135	119	152	2391	
Makroskopik olarak	27	144	82	47	39	28	13	12	83	47	39	7	568	23.75*
Lezyonun														
Hafif	11	84	46	34	16	9	6	3	45	29	27	-	310	54.58**
Orta	9	43	21	7	15	14	5	7	26	12	8	4	171	30.11**
	7	17	15	6	8	5	2	2	12	6	4	3	87	15.31**

*

**

de



(n:568)

Makroskopik olarak p

saptanan

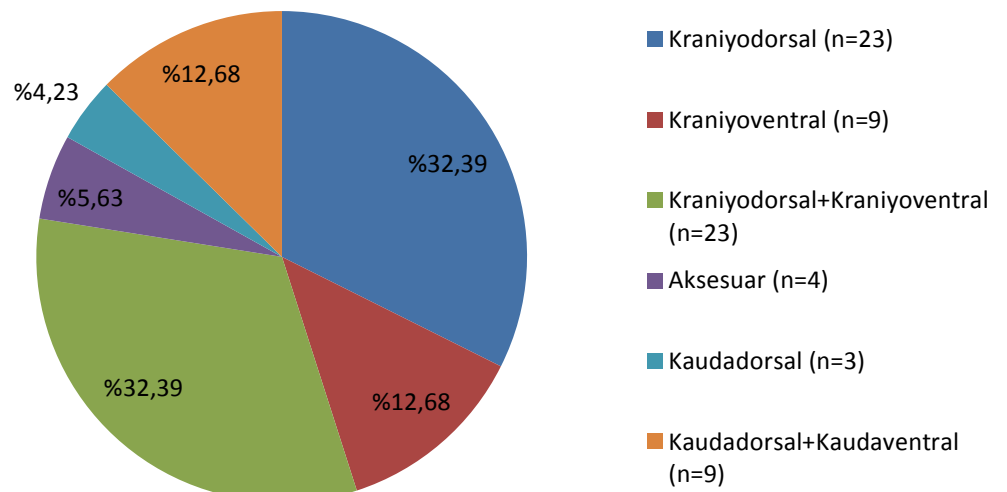
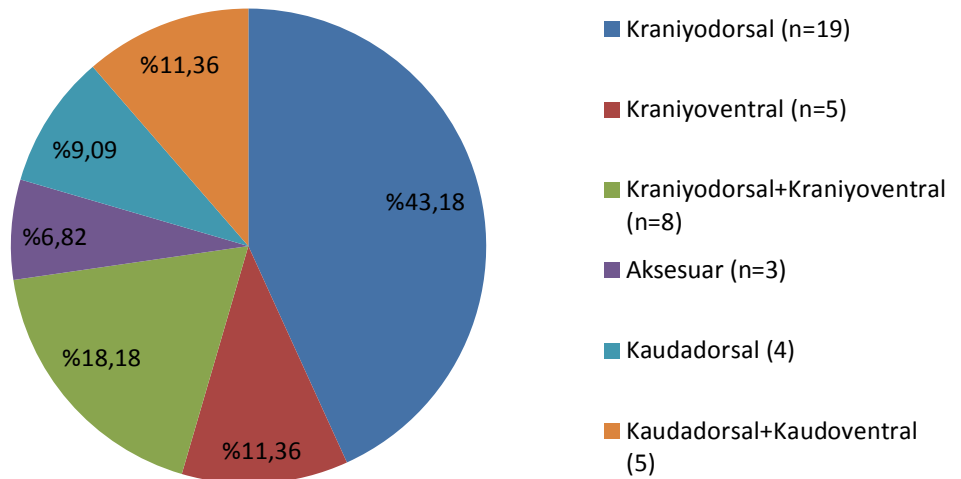
demikroskopik

suppuratif (n=71,

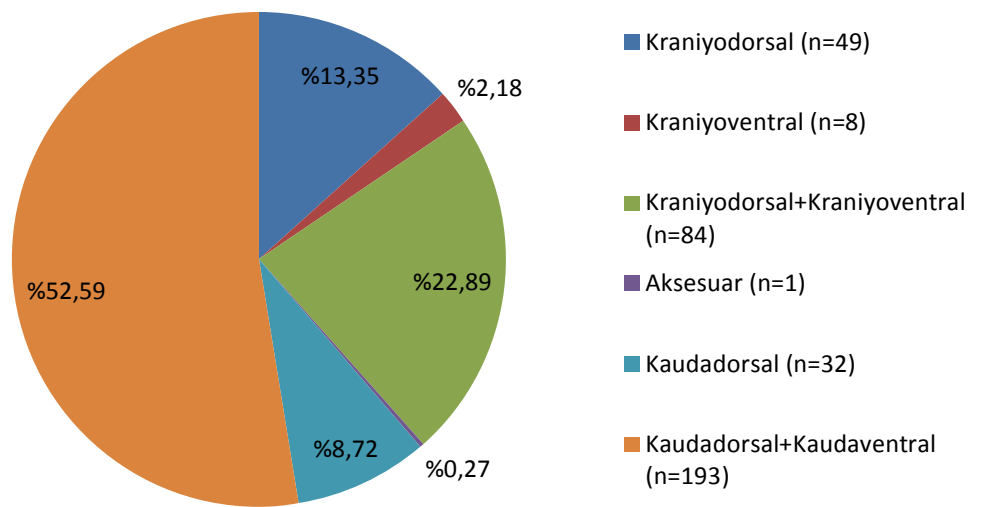
ve

immunohistokimyasa

,



. Suppuratif b



Tablo 4.

	Ocak		Mart	Nisan		Haziran	Temmuz		Ekim				Toplam	% *
	3	15	3	5	-	1	-	-	11	4	1	1	44	9.12
Suppuratif	5	5	2	5	8	6	2	-	23	10	5	-	71	14.73
P	9	97	64	50	15	34	4	2	37	22	24	9	367	76.14

-

(

i ise

().

olgulara

lezy

-

).

367

in

küti (

bir

5.2. Mikroskopik Bulgular

5.2.1.

M

i

-

epitellerinde ise hiperplazi mevcu

dokuda (BALT) hiperplazi ise 27 olguda dikkati BALT hiperplazisinin

ir

).

5.2.2. Suppuratif Bronkopn

alveol epitellerinde nekroz,

dejenerasyon ve deskuamasyon belirti ol

ofaj ile birlikte

konje

ek

edildi.

5.2.3.

kroskobik Bulgular

p

nte

ol epitelinde

hiperplazi mevcuttu. B

a belirgin bir

olar lenfoid hiperplazi nedeniyle

,

5.3.

Histopatolojik Bulgular

Tablo 5.

	Ocak		Mart	Nisan		Haziran	Temmuz			Ekim			Toplam	%
PI3	-	5	8	7	-	2	-	-	2	2	6	-	32/482	6.63%
RSV	-	-	1	2	-	-	-	-	-	-	1	-	4/482	0.82%
PPR	-	-	-	-	-	-	-	-	-	-	-	-	-	-

5.3.1.

ar

5.3.1.1. P

olguda tespit edildi. PI3 pozitiflik sapta

ise

Tablo 6.

Olgu No	ol		al		BALT	alan
	epiteli	epiteli	bez	doku		
	++	++	-	-	+	-
	++	+	-	-	-	-
	+	++	-	-	-	-
	++	++	+	-	-	-
	+++	+++	-	-	+	-
Mart 1	++	+++	-	-	+	+
Mart 2	++	+	+	-	-	-
Mart 3	+	++	-	-	-	-
Mart 4	+++	+++	-	+	-	+
Mart 5	+++	+++	-	-	-	+
Mart 6	+++	+++	+	-	-	+
Mart 7	++	+	-	-	-	-
Mart 8	++	+++	-	-	+	-
Nisan 1	+++	+++	-	-	-	+
Nisan 2	++	+	-	-	-	-
Nisan 3	+	+	-	-	-	-
Nisan 4	++	+++	-	-	-	-
Nisan 5	+++	++	-	-	+	-
Nisan 6	++	+++	-	-	-	+
Nisan 7	++	+	-	-	+	-
Haziran 1	++	++	+	-	-	+
Haziran 2	++	++	-	-	-	-
	+	+	-	-	-	-
	+	++	+	-	-	-
Ekim 1*	-	+	-	-	+	-
Ekim 2	++	+	-	-	+	-
	++	++	-	-	++	-
	+++	+++	-	-	-	+
	+++	+++	+	-	-	-
	+++	++	-	-	-	-
	++	+	-	-	+	-
	++	+	-	-	-	-
Toplam	31	32	6	1	10	8

*

viral antijenler ()

PI3

sitoplazmada diffuz bir

edildi

itiflik dokunun genelinde diffuz bir

septumlardaki makrofajlar

32), al bezlerde ,1 olguda ise peribr

dokudaki kondrositlerde

PI3

pozitif suppuratif

ekil 35)

5.3.1.2. R

RSV viral antijenleri 4 (%0.82) olguda tespit edildi. RSV viral antijenlerinin

Tablo 7.

ve

Olgu No	al		BALT			
	epiteli	epiteli	bez	doku		alan
Mart 1	-	++	-	-	-	-
Nisan 1	-	-	-	-	-	+
Nisan 2	-	++	-	-	-	-
	-	-	-	-	-	+
Toplam	0	2	0	0	0	2

RSV pozitif olgularda immun pozitiflik genel olarak

olguda immun boyanma sadece
ol epitelinde, nde ise sadece interalveoler septumlardaki lenfosit

5.3.1.3.

PI3 ve RSV pozitif olgularda CD3

tablo 8 ve

Negatif kontrolde CD3 , PI3 ve
tespit edildi.

PI3 pozitif olgula

29 olgu

ve 10 olgu ile interalveolar septumlarda

immunpozitiflik tespit edildi il 45).

Tablo 8. PI3 pozitif olgularda CD 3pozitif

Olgu No	BALT		
	++	++	+
	++	++	+
	+	+	-
	+++	++	++
	+++	+	++
Mart 1	++	+	+
Mart 2	++	+	-
Mart 3	++	++	+
Mart 4	+++	++	++
Mart 5	+	++	+
Mart 6	+++	++	+
Mart 7	++	+	-
Mart 8	+++	+++	++
Nisan 1	++	+	+
Nisan 2	++	-	-
Nisan 3	++	-	-
Nisan 4	+++	++	+
Nisan 5	++	++	+
Nisan 6	+++	+++	++
Nisan 7	+++	+	+
Haziran 1	+	+	+
Haziran 2	+++	++	+
	+++	++	+
	++	+	+
Ekim 1	+	-	-
Ekim 2	+++	+++	++
	++	+	+
	+++	++	+
	+	+	-
	++	+	-
	+	+	-
	++	+	-
Toplam	32	29	10

Tablo 9. RSV pozitif olgularda CD3pozitif

BALT			
Mart 1	+	+	-
Nisan 1	++	+	+
Nisan 2	+++	+++	++
	++	++	+
Toplam	4	4	3

5.3.2.

5.3.2.1.

PI3 pozitif olgulara

infiltr

Nekrotik

belirlendi

olguda ise

p

olguda

dolu old

simcikleri

Tablo 10. P13

histopatolojik bulgular.

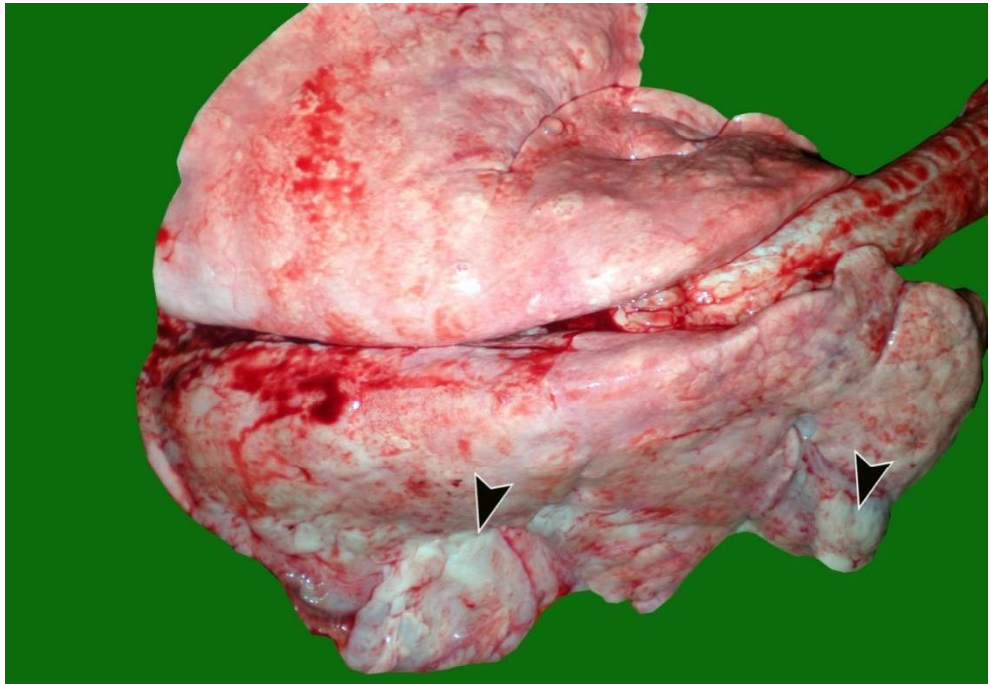
Lezyon	Ocak		Mart	Nisan		Haziran	Temmuz		Ekim				Toplam	%
infiltrasyonu	-	4/4	8/8	8/8	-	2/2	-	-	2/2	2/2	6/6	-	32/32	100
-														
epitelinde hiperplazi	-	4/4	8/8	8/8	-	2/2	-	-	2/2	2/2	6/6	-	32/32	100
septumda fibrozis	-	4/4	8/8	8/8	-	2/2	-	-	2/2	2/2	6/6	-	32/32	100
-														
epitelinde deskuamasyon	-	4/4	7/8	7/8	-	2/2	-	-	2/2	2/2	5/6	-	29/32	90.62
	-	2/4	6/8	8/8	-	1/2	-	-	1/2	1/2	4/6	-	23/32	71.87
Atektazi	-	0/4	4/8	7/8	-	0/2	-	-	2/2	0/2	6/6	-	19/32	59.37
Lenfoid hiperplazi	-	4/4	3/8	2/8	-	1/2	-	-	0/2	1/2	2/6	-	13/32	40.62
Alveolar epitelizasyon	-	1/4	3/8	6/8	-	0/2	-	-	0/2	1/2	1/6	-	12/32	37.50
	-	0/4	1/8	0/8	-	0/2	-	-	1/2	1/2	1/6	-	4/32	12.50
	-	0/4	0/8	0/8	-	0/2	-	-	1/2	1/2	0/6	-	2/32	6.25
	-	-	-	-	-	-	-	-	-	-	-	-	0/32	0.00
	-	-	-	-	-	-	-	-	-	-	-	-	0/32	0.00

RSV poziti

epitelinde hiperplazi

BALT ndaki alveolar

dokuda

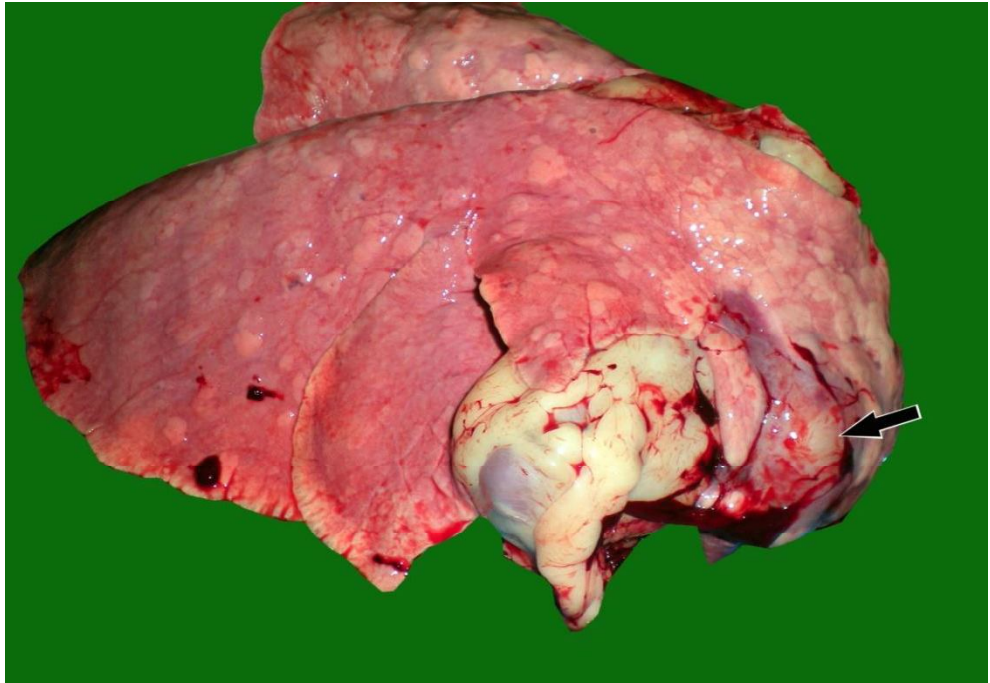


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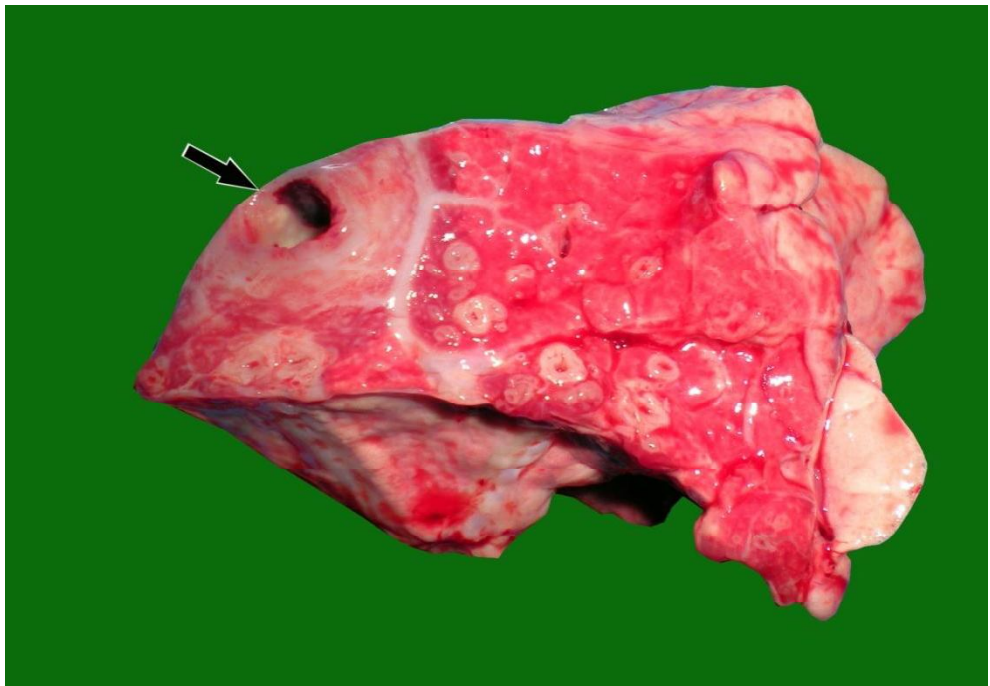


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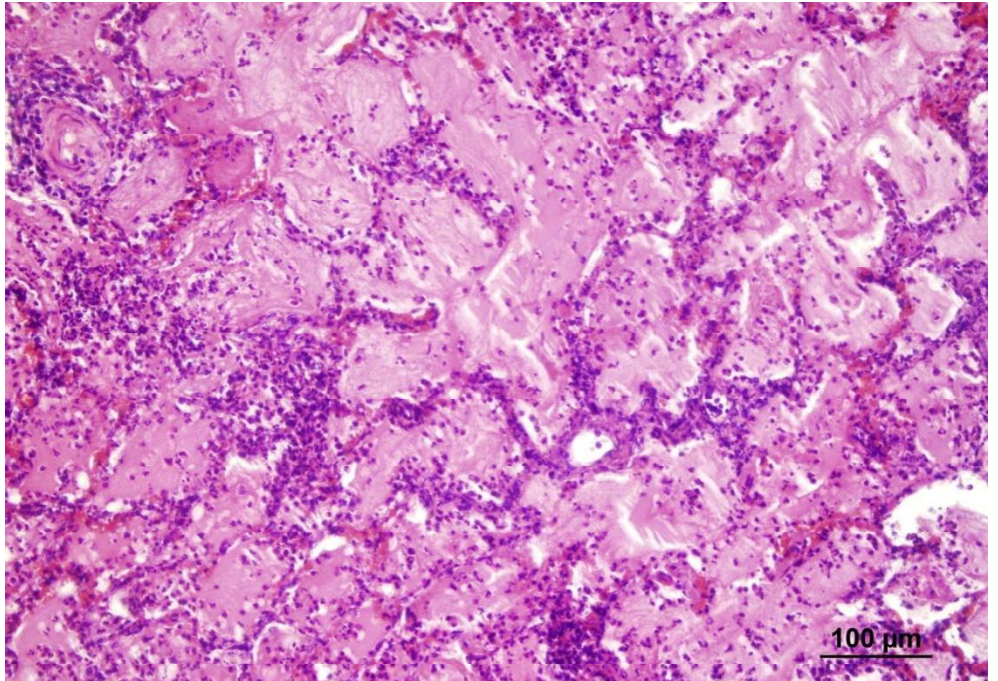


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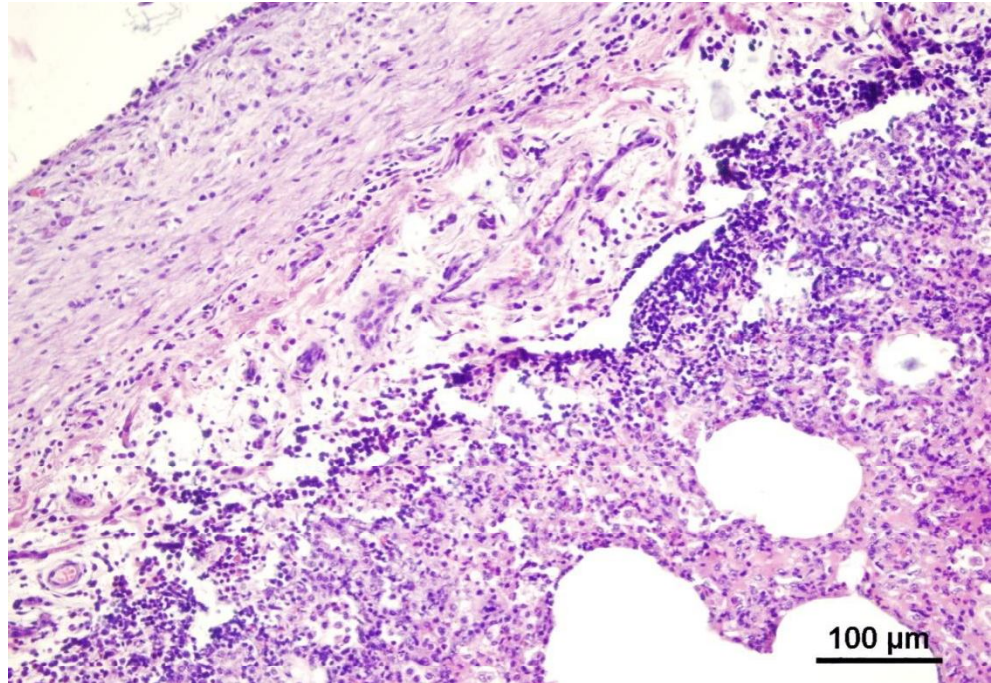


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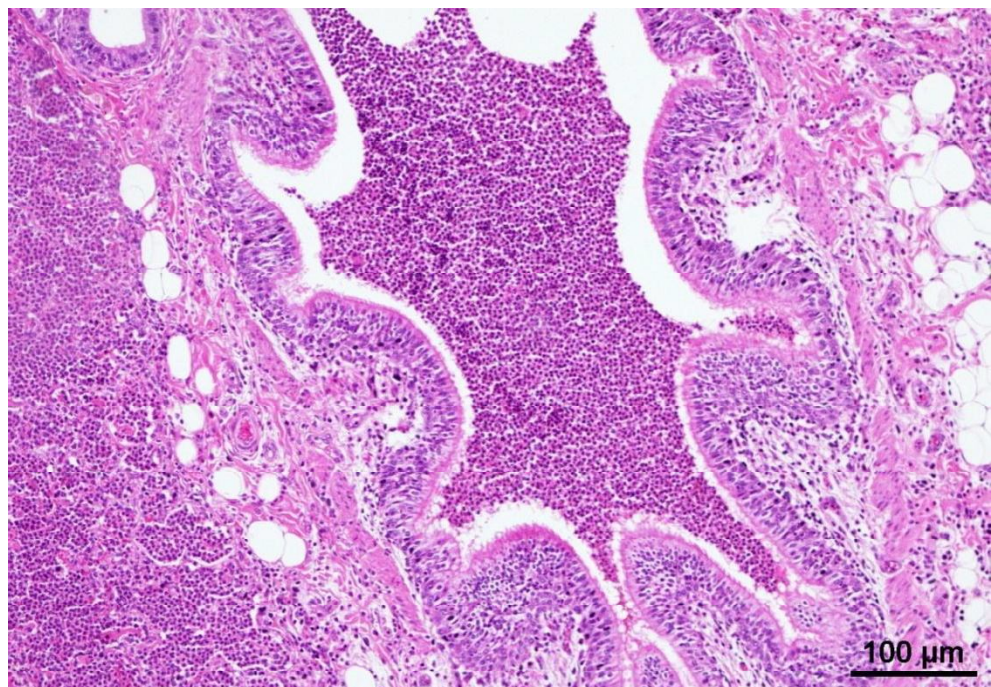


kleri

ve makrofajlar. x20, HE.

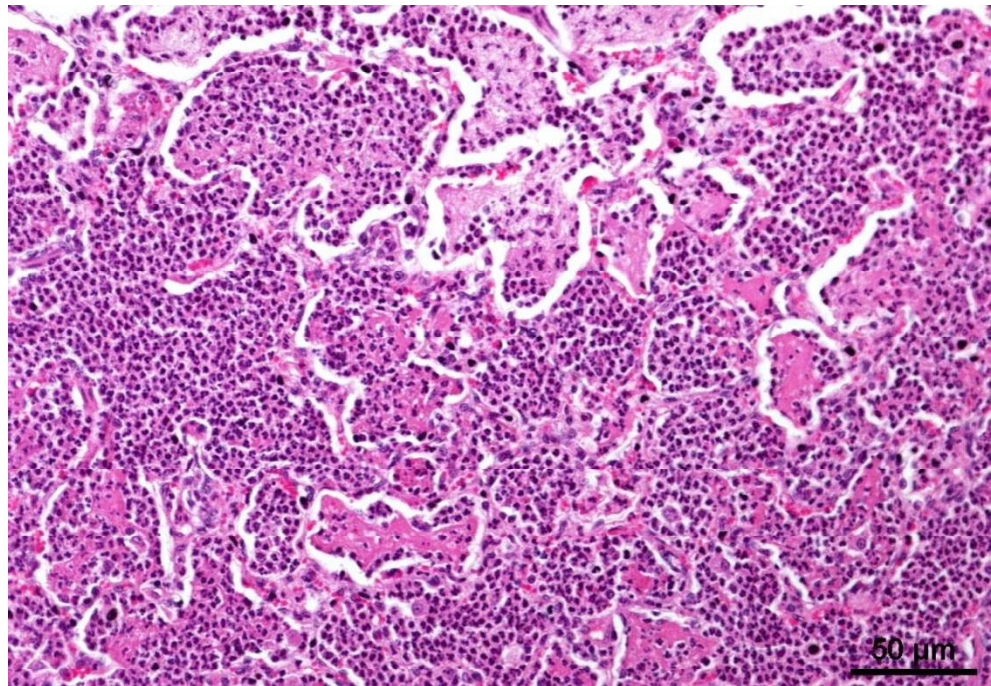


x20, HE.



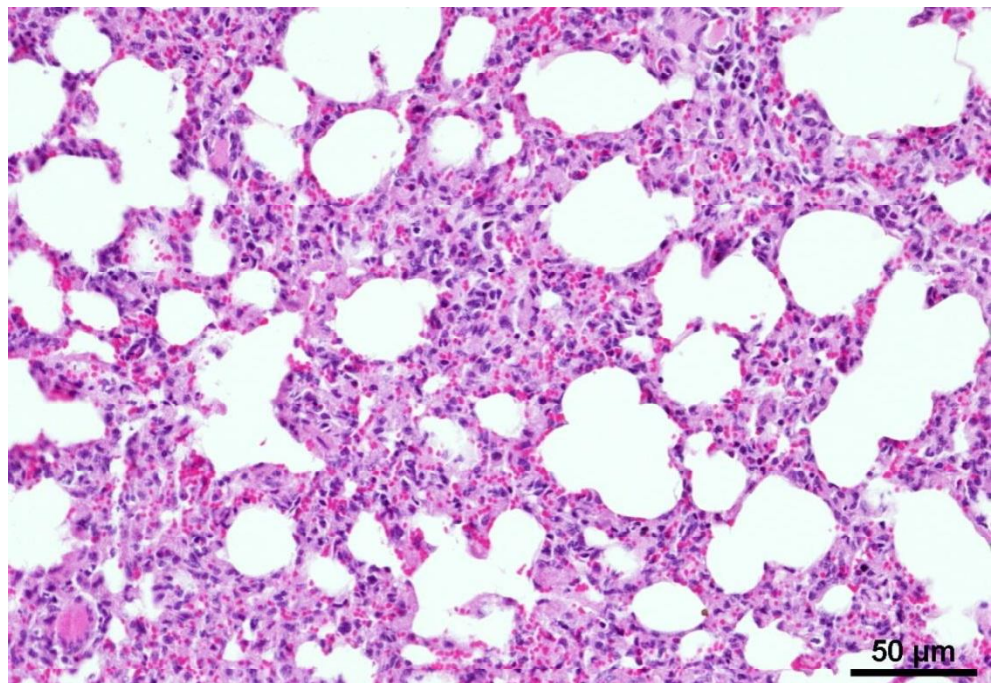
zengin

eksudat. x10, HE.



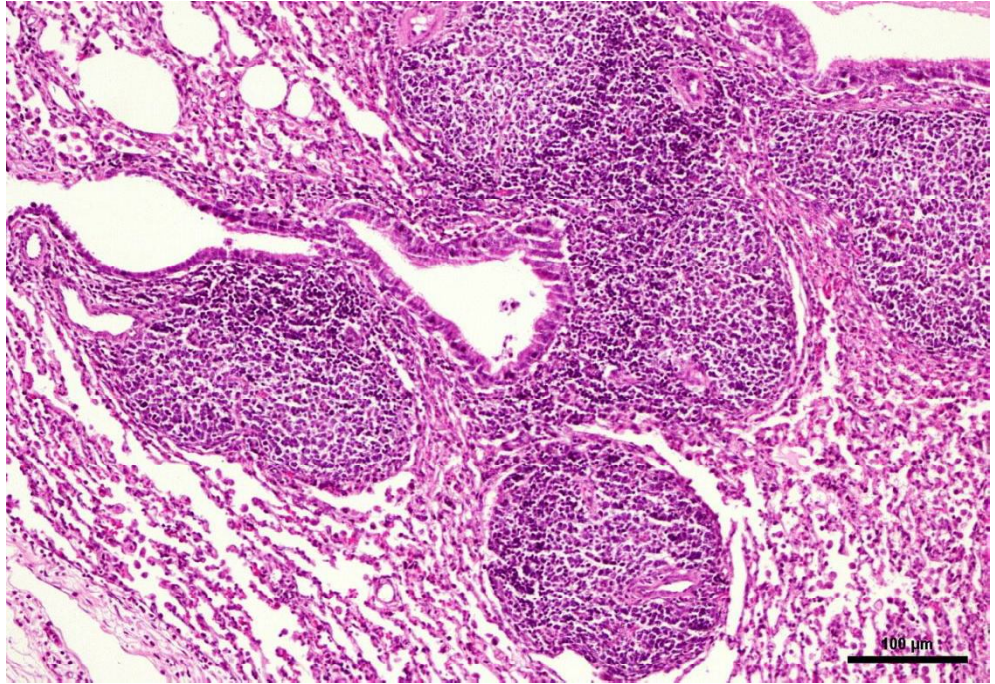
Suppuratif

zengin eksudat. x20, HE.



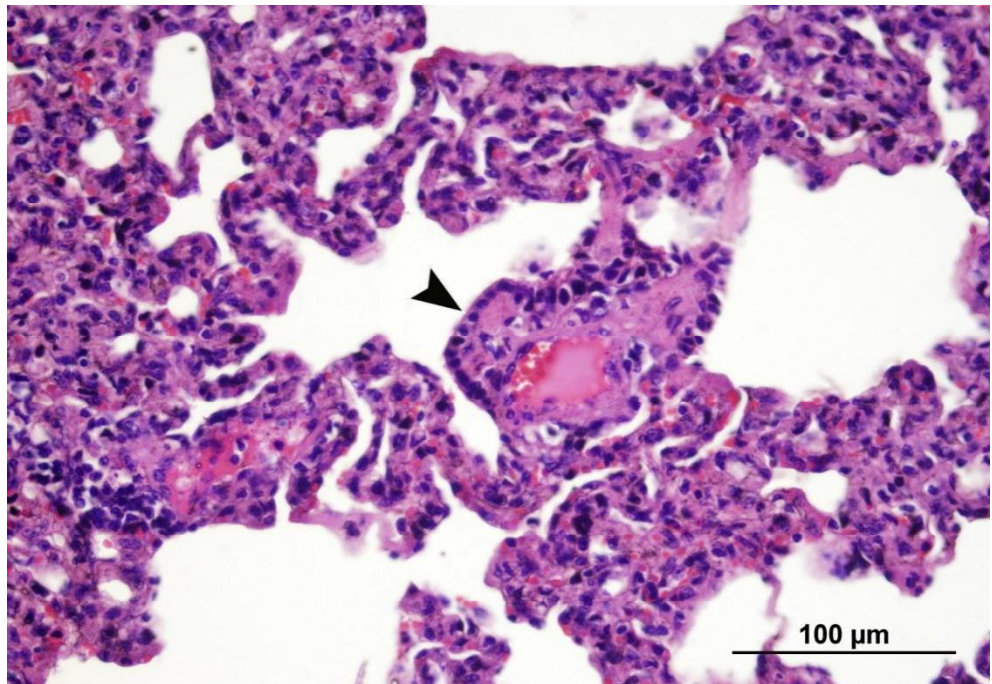
mo

x20, HE.



hi

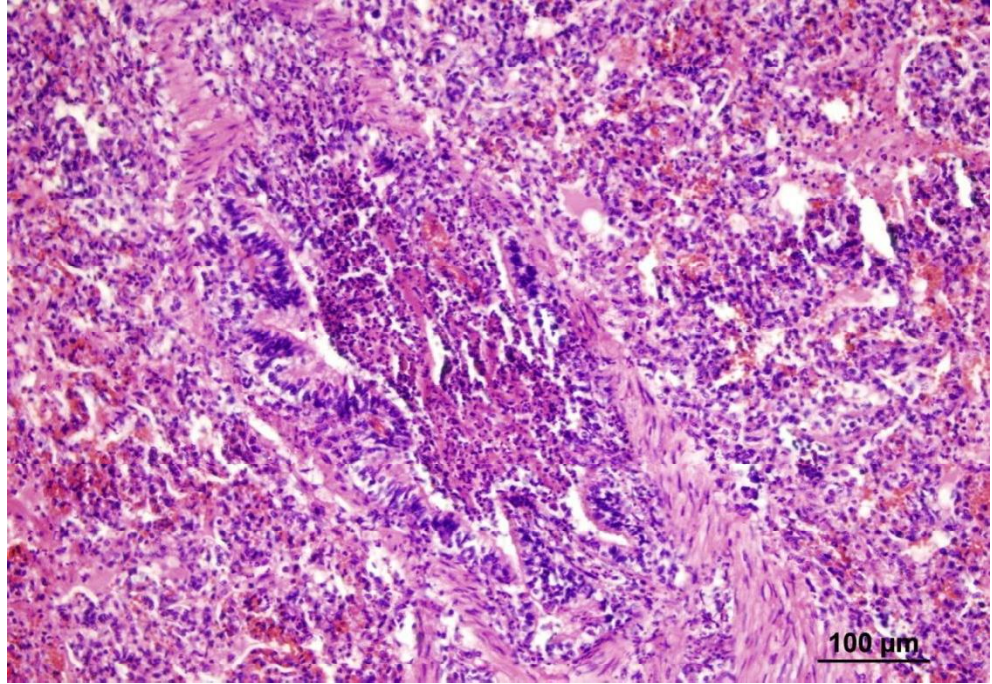
x20, HE.



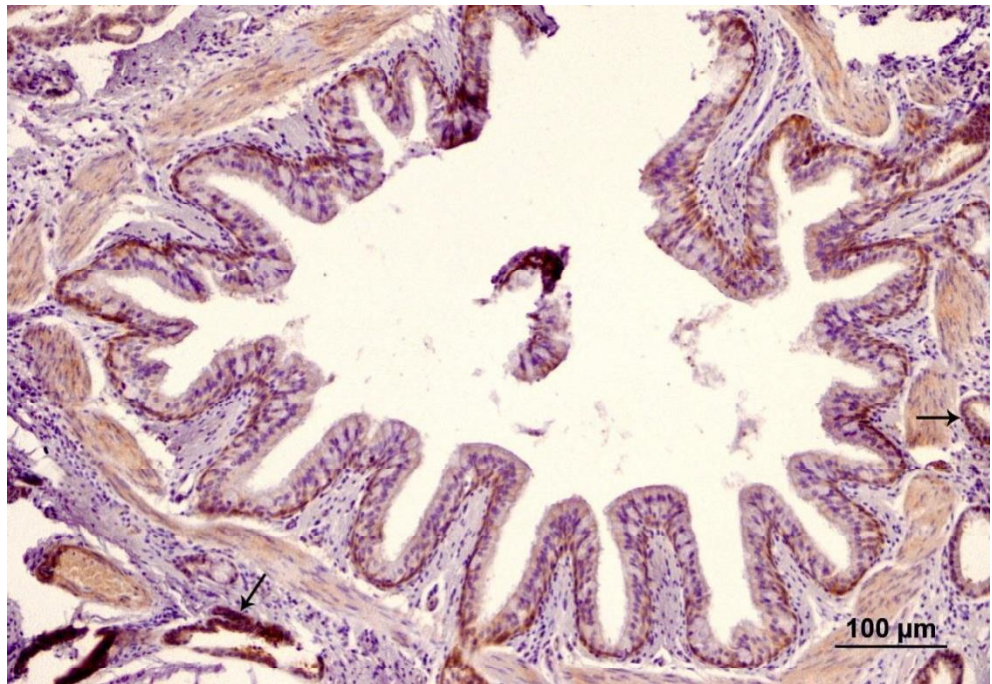
Alveolar epitelizasyon

(ok

x40, HE.

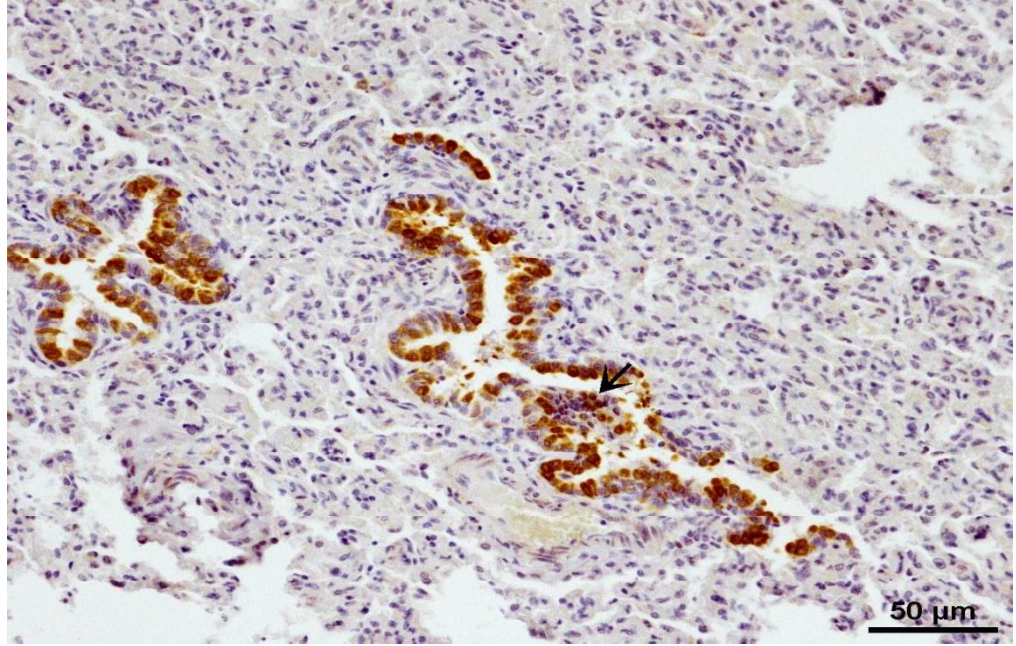


, x20, HE.



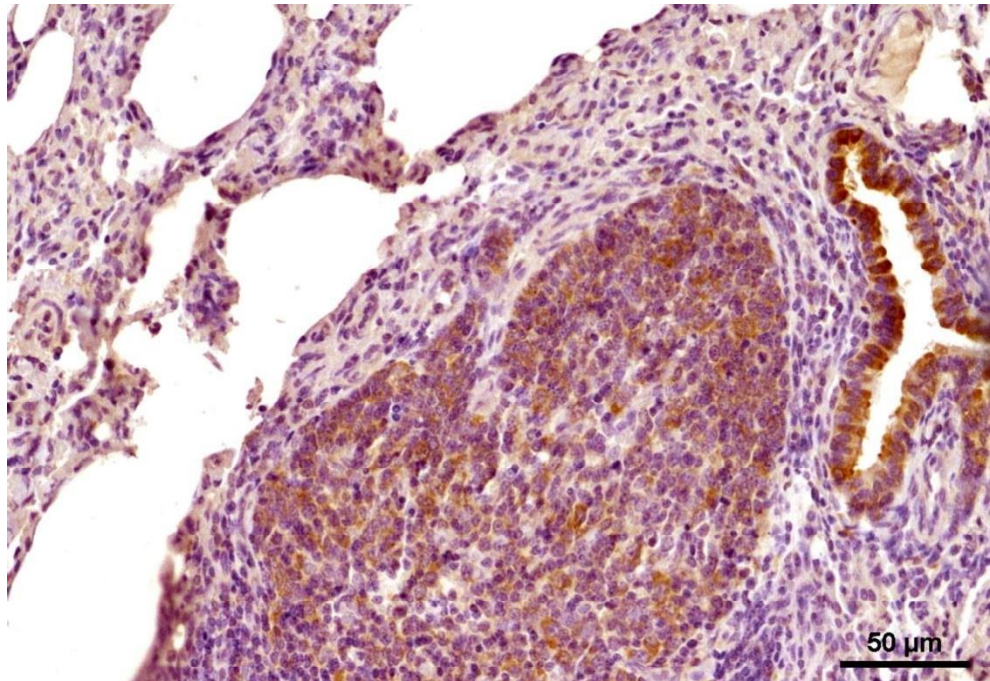
(oklar) PI3 . x20,

ABC-P.

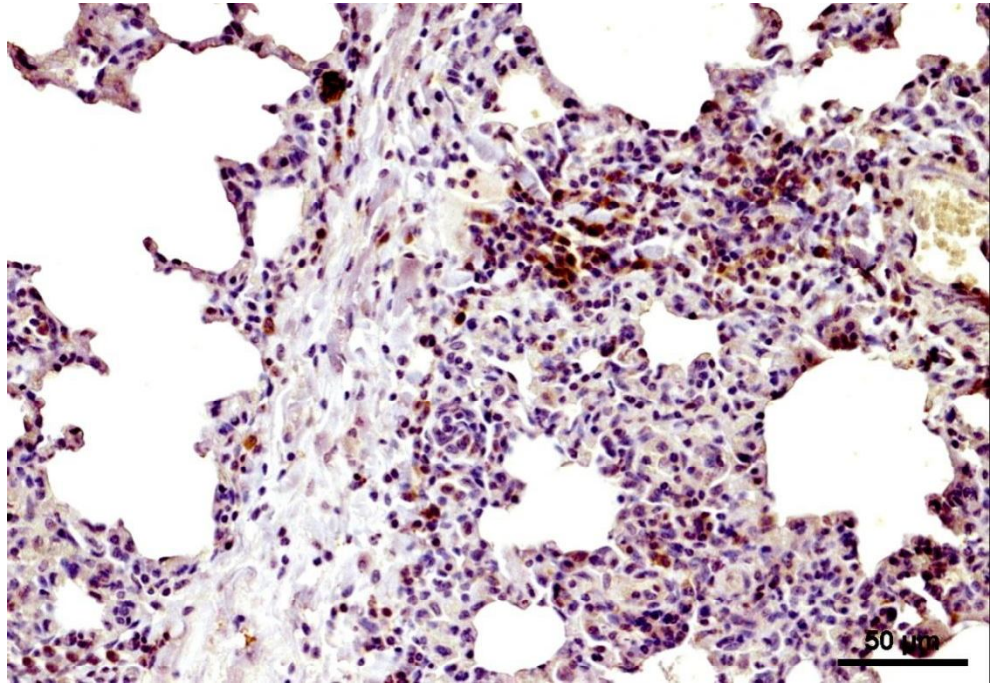


ol epiteli ile lumenindeki eksudatta

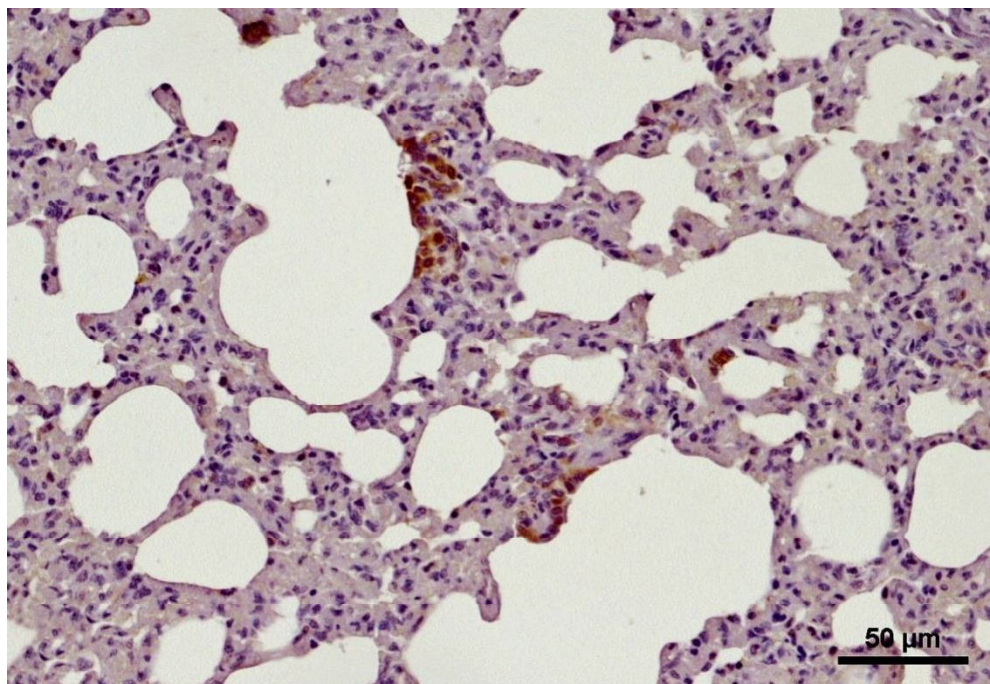
x20, ABC-P.



x20, ABC-P.

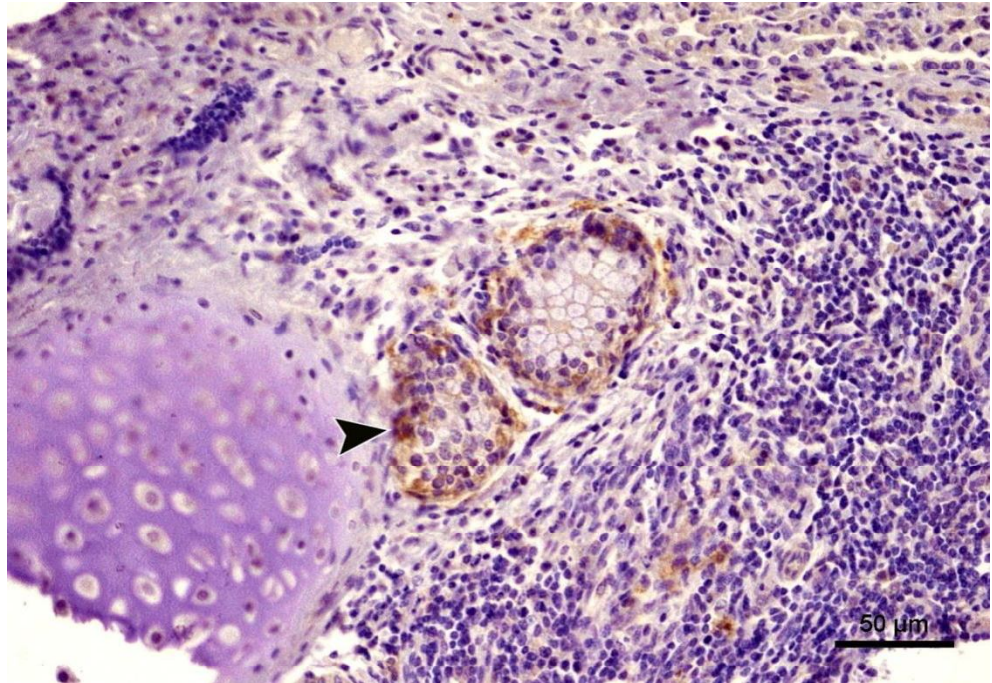


x20, ABC-P.



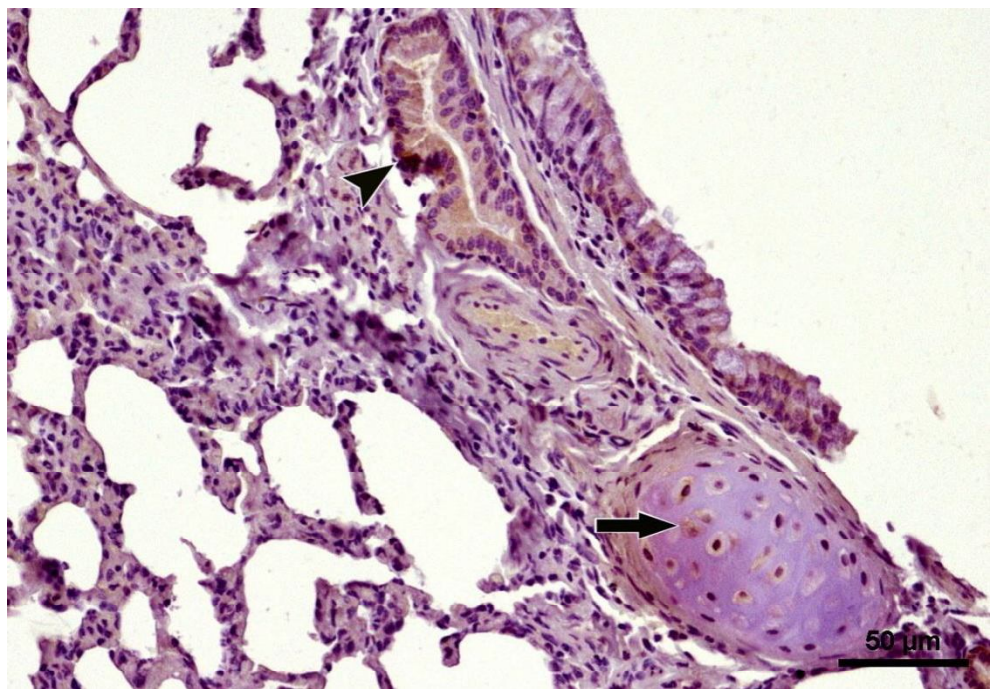
Alveol epit

x20, ABC-P.



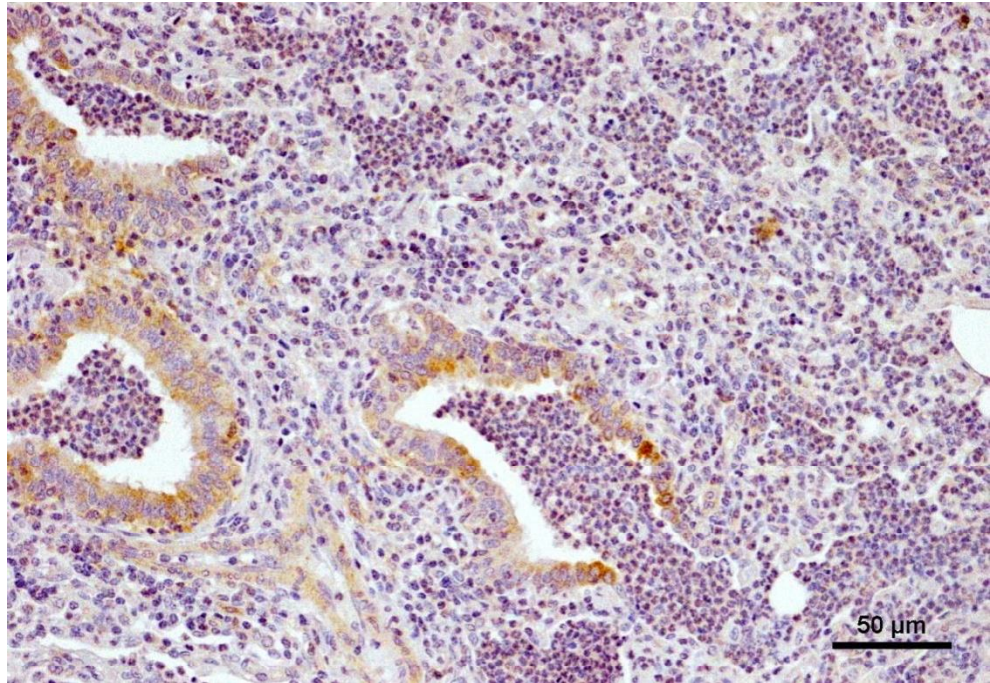
al bez

x20, ABC-P.



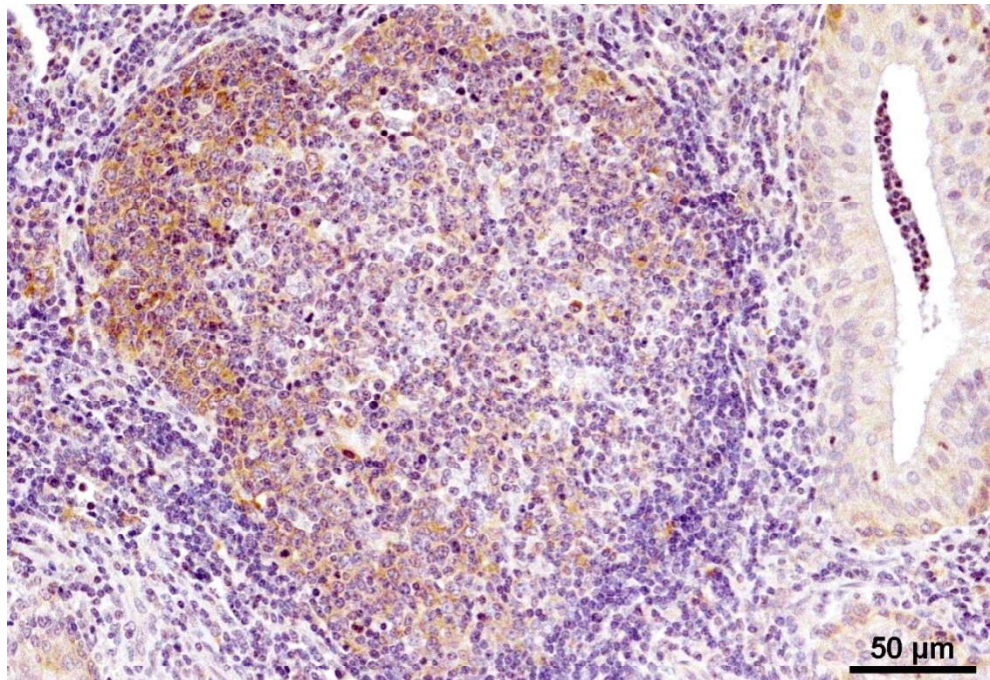
(ok)

x20, ABC-P.



S

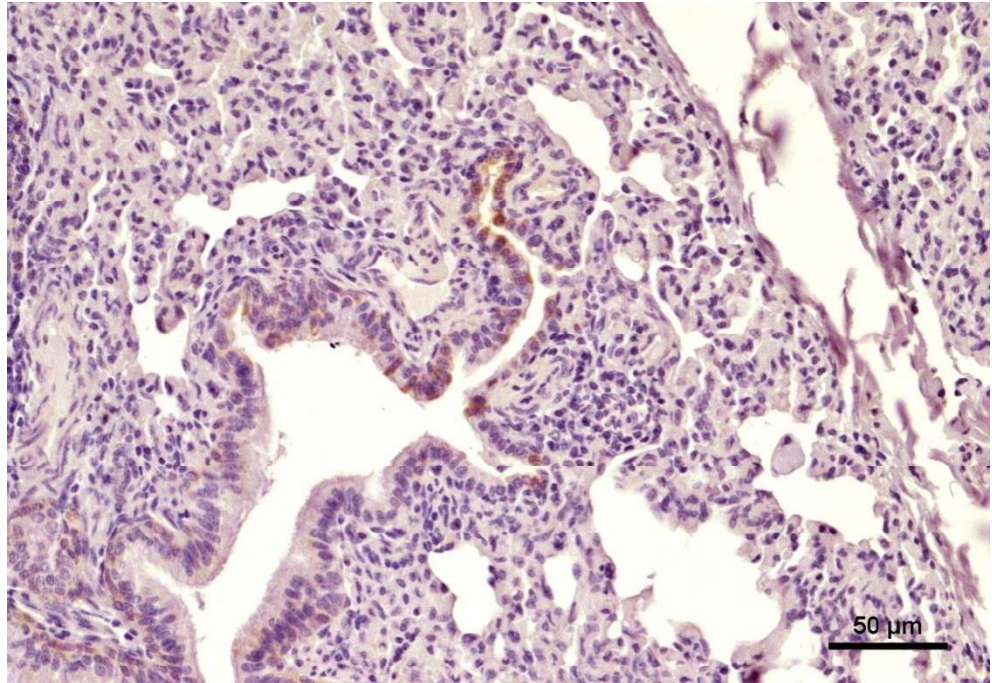
x20, ABC-P.



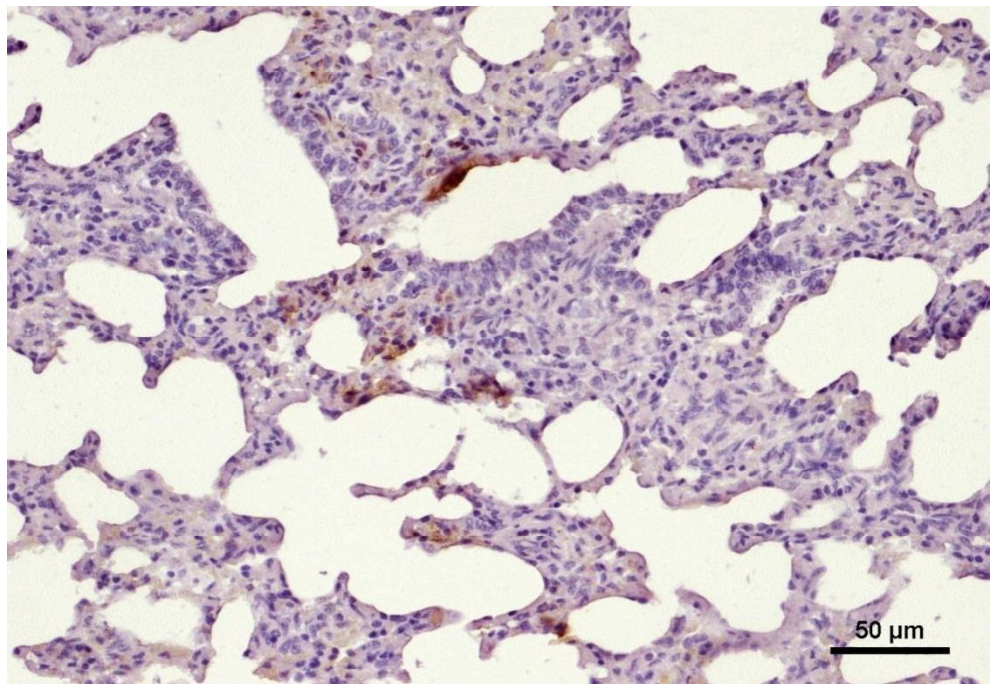
Sup

x20,

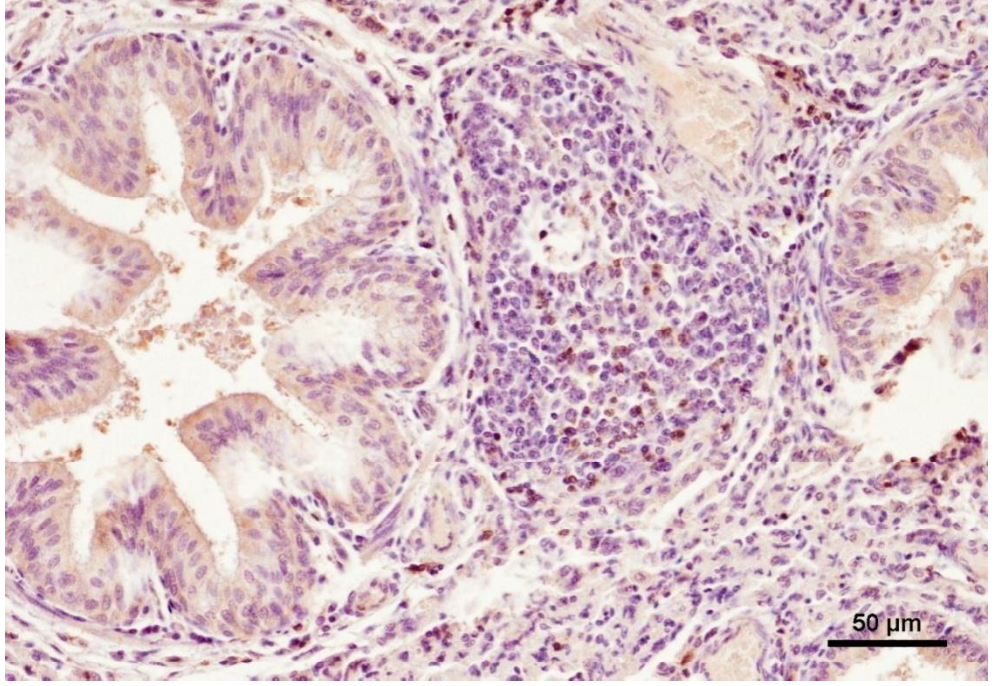
ABC-P.



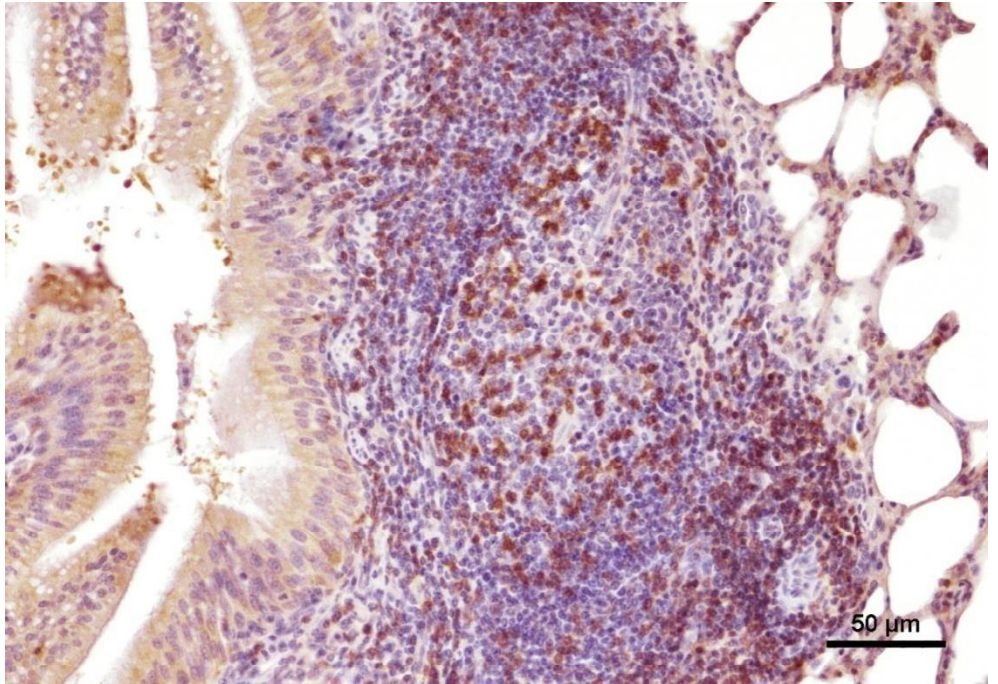
x20, ABC-P.



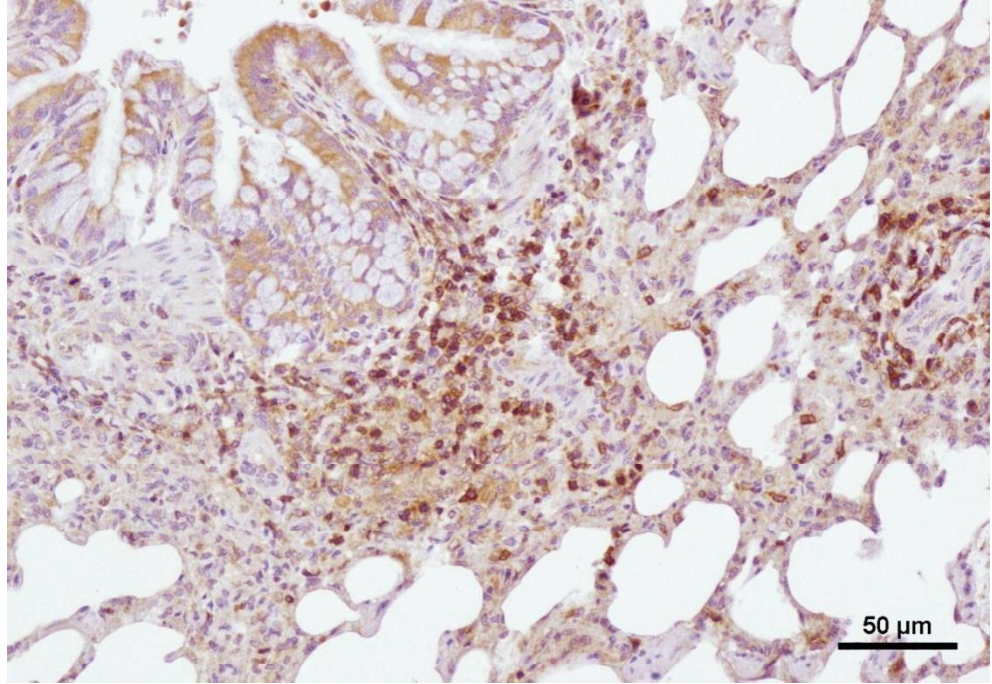
x20, ABC-P.



Negatif kontrol. CD3pozitif T lenfositleri. x20, ABC-P.

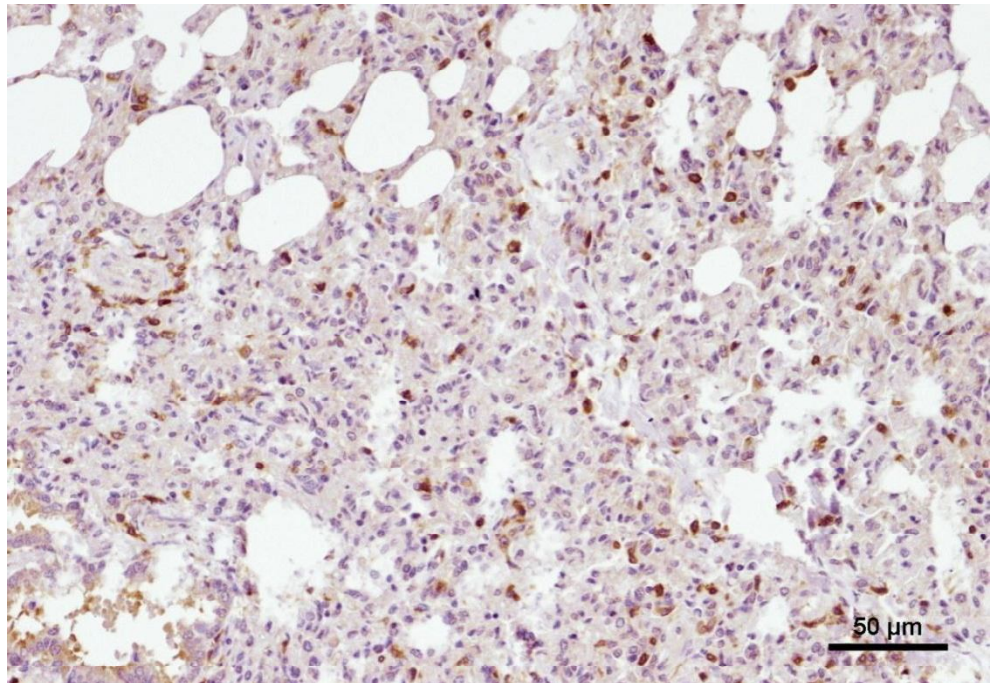


pozitif T lenfositleri. x20,
ABC-P.



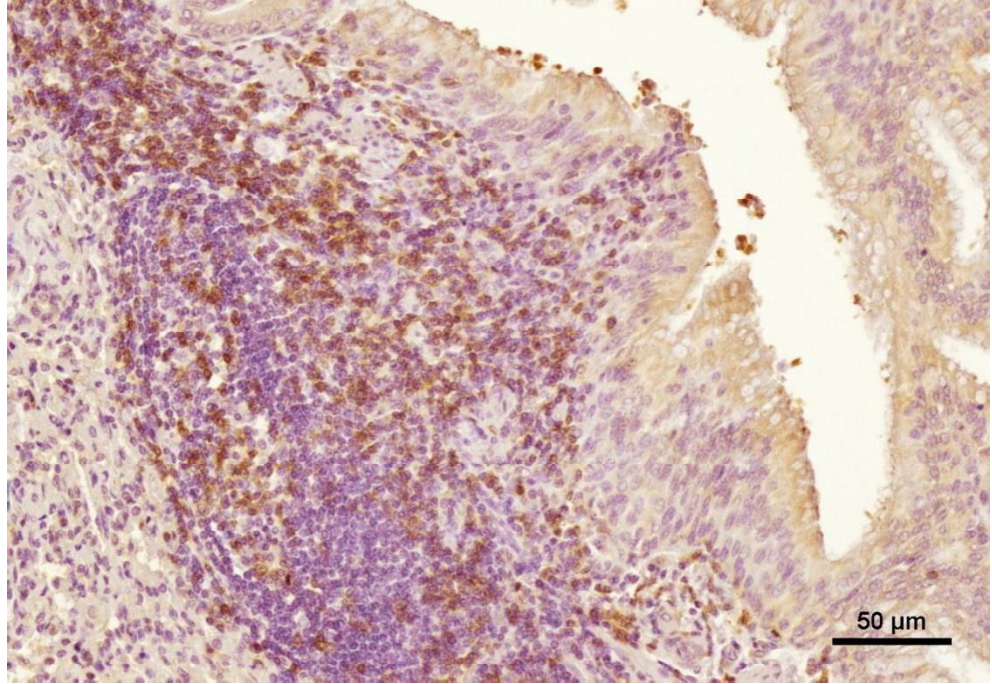
oler alanda CD3pozitif T

x20,ABC-P.

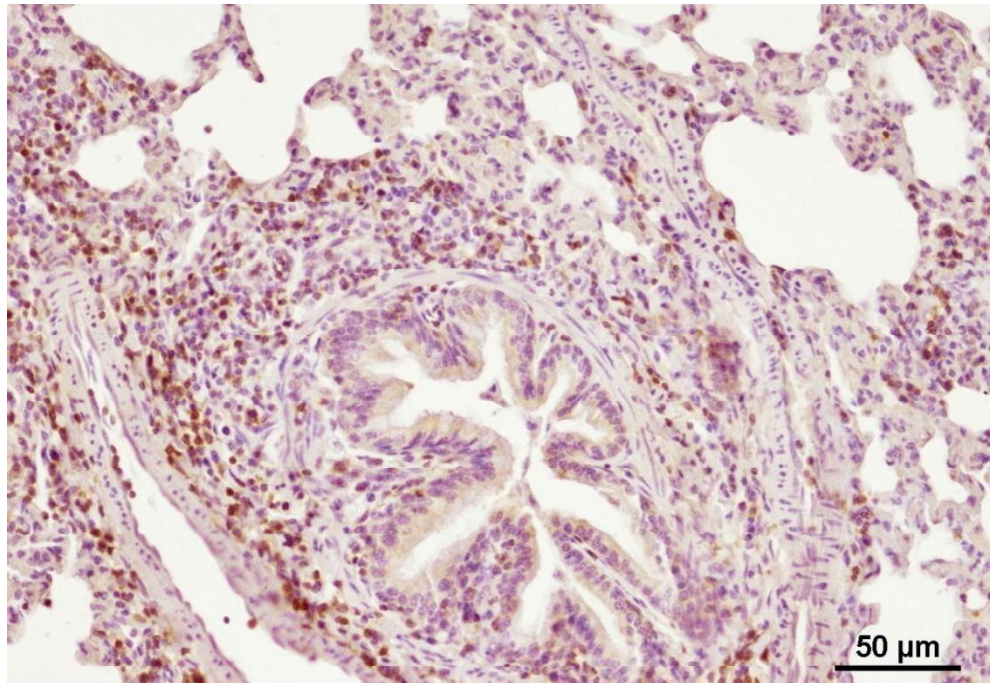


. PI3 pozitif olguda interalveolar alanlarda CD3pozitif T

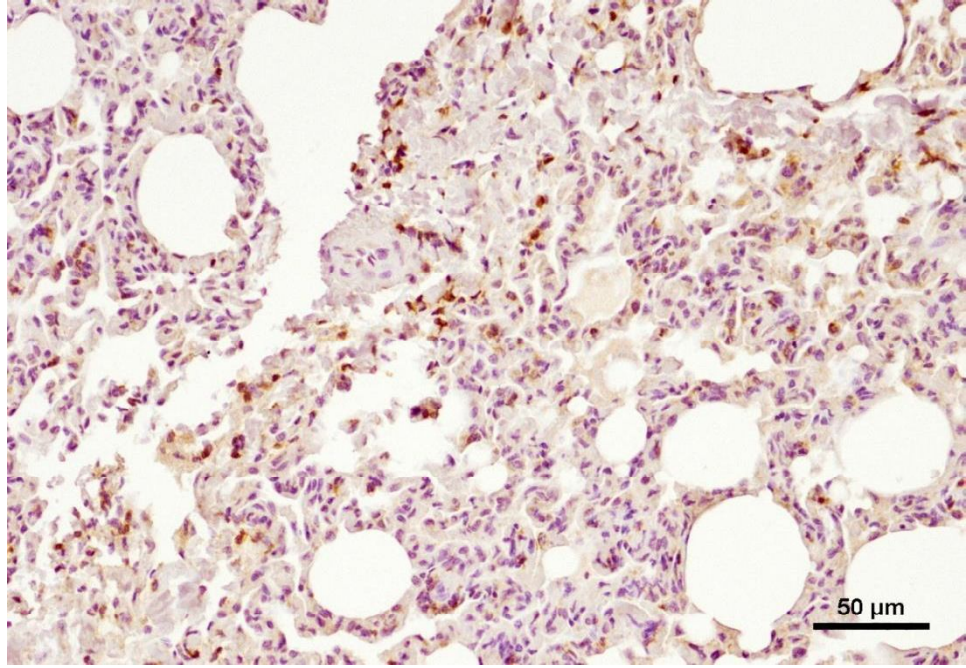
x20,ABC-P.



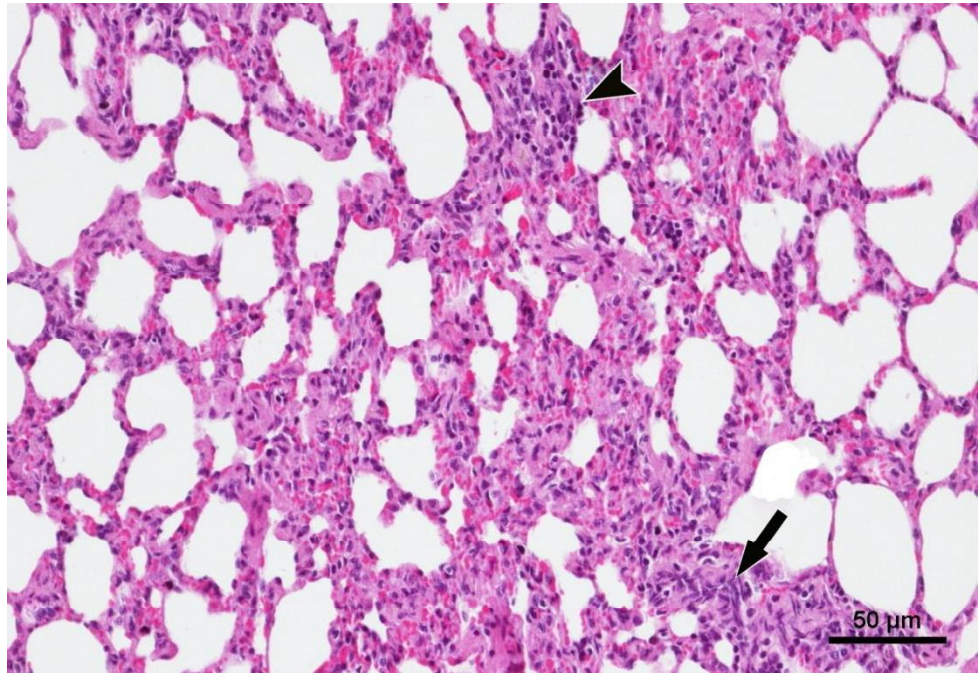
D3pozitif T lenfositler. x20,
ABC-P.



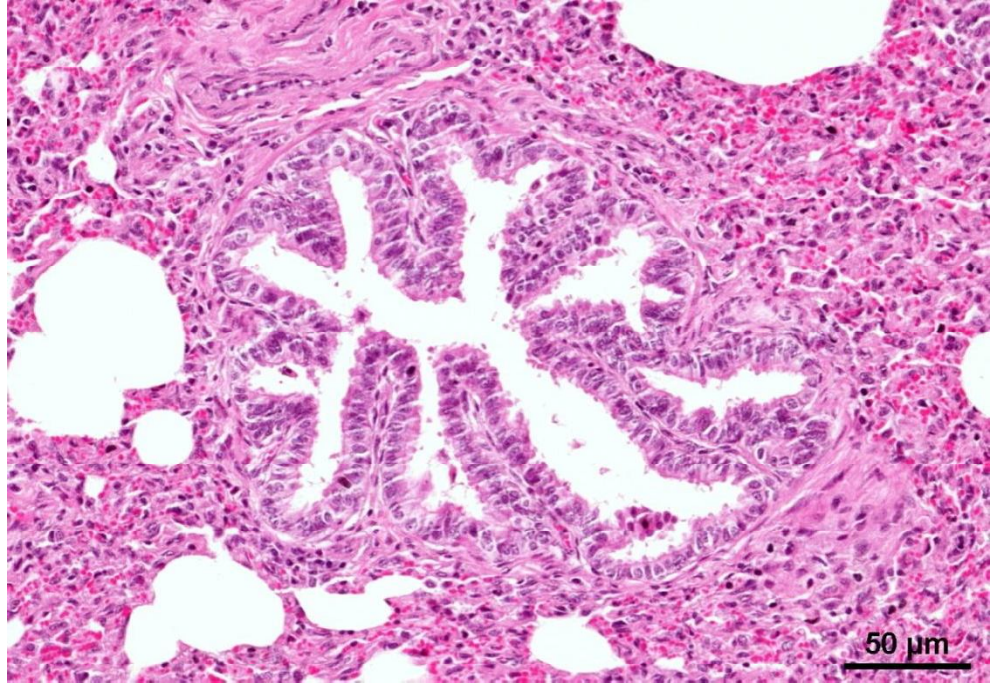
oler alanda CD3pozitif T
x20,ABC-P.



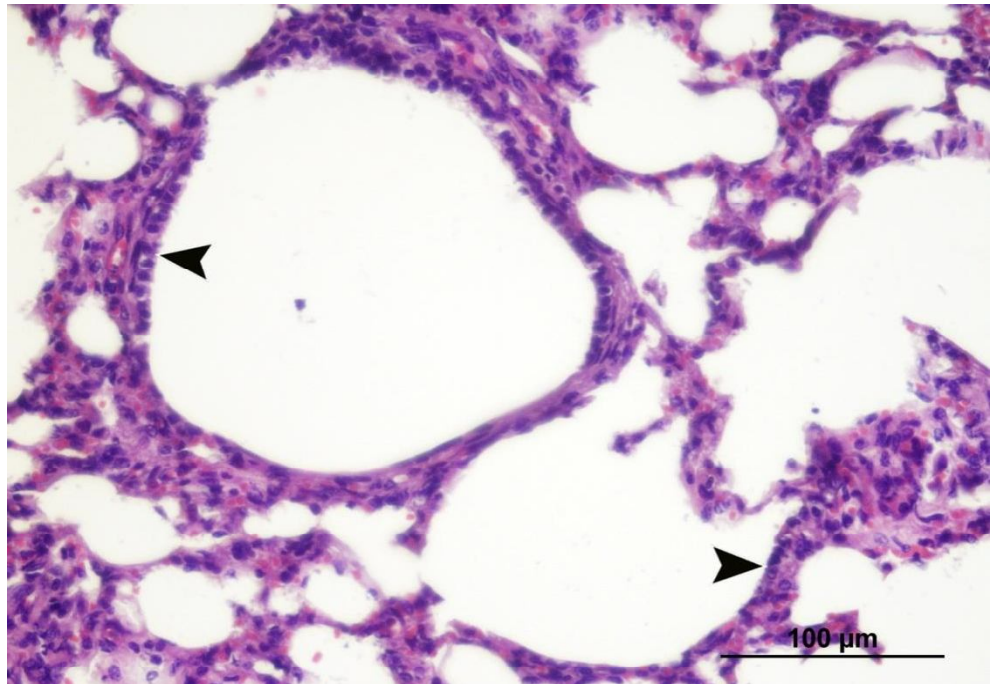
. RSV pozitif olguda interalveolar alanlarda CD3pozitif T lenfositleri. x20,ABC-P.



PI3 pozitif olguda
ve fibrozis (ok). x20, HE.



ol epiteline hiperplazi. x20, HE.



PI3 pozitif olguda alveolar epitelizasyon (ok
x20,HE.

6.

-%4.7, koyunlarda ise %5.8-

132). da 1

132). lde koyun,

da

133, 134, 135). Bunun nedeni, kraniyal loblardaki

ve kolay

136

olgununda %76.14 (

entansif

larda koyunlarda %4.13,

kuzularda %16.5 (moniyi ise koyunlarda %1.46-28.96 (3,

134);kuzularda %13.3-%53.2 (5, 101, 132, 137

tespit edilen (%9.12) ve

supp (%14.73

, PI3 kuzularda viral antijenlerin

),

(75), a), makrofajlar (101) ve plazma

101) sitoplazmik

antijenlerinin de bez epitel

). Sunulan

10 olguda

epit al be

. RSV pozitif olarak tespit edilen 4 olguda ise viral

antijenlerinin in; etken, etkenin virulensi,

Yeni d

enfeksiyonunda de

). Kuzulardaki deneysel PI3 enfeksiyonunda ise viral antijenler

7). Koyunlarda PI3

14.

, RSV antijenlerine sadece

nasosunda . Koyun

ve kuzulardaki deneysel

BALT,

intersitisyel

sinsityal

eksudatta tespit

PI3 ve RSV

i

PPR viral antijenlerinin

;

(50, 51)

koruyucu bir y

PI3 enfe

ve

g

). Kuzular , kolostrum ile

maternal antikorlar

sayesinde

).

r

olan

da tespit edil (63).Mevsim , 2

M -

iddetli klinik belirtiler

et (127).T

lenfositlerinin 142). Sunulan

e

,negatif kontrol

septumlarda

K histopatolojik olarak atelektazi,

alveoler epitelizasyon, lenfoid hiperplazi ile karak

79) ve s) bildiril tir. Koyunlarda

-

ve makrofajlar

olu (138).Koyun ve kuzularda deneysel

rofil, lenfosit, monosit infiltrasyonla ki

nekroz ile karakterize

atelekt 139). On

- ol epitellerinde
hiperp 139). S
enfeks a
makrofaj ve
in bir eksudat
da 32 PI3 ve 4 RSV pozitif olgunun
histopatolojik incelemesinde interalveoler septumlarda fibrozis, lenfosit ve
makrofaj infiltrasyonlar
epitellerinde hiperplazi, , atelektazi, lenfoid
infiltrasyonlar tespit edil . PI3 viral antijeni tespit edilen suppuratif
ol
. Sunulan
datespit edilen histopatolojik bulgular
.
tif 4 olgunun

6, 143). P

sekonder bakteriyel bir enfeksiyona maruz
kal
lar

nedeniyle olu (144, 145, 146, 147, 148). Alveolar

ar

132, 149).

spesifik bulgu olarak

, 79, 101,

121). Koyunlarda deneysel PI3

). Kolostrum ile beslenen 3-5

u

,enfeksiy

e ve sinsityal

e etki).

olu). Deneysel

RSV enfeksiyonlu koyun ve kuzularda virus ve 11.

ra 139).

151, 152) ya da etkenin

varl , 78, 79,

153, 154 PI3 ve RSV pozitif olgularda in

na ya

daakut enfeksiyon

veya

PI3 ve RSV

spesifik bulgulardan birinin

desolunum yolu epitelindeki asidofilik ink

(10). Koyun ve kuzularda da d

).

rda PI3 virusu verildikten

simcikleri tespit

).

ilgili

PI3 enfeksiyonunda virus inokulasyonundan

ifade

(148).

PI3 pozitiflik belirlenen

ise

). S

sekonder bakteriyel etkenlerlekomplike olan RSV

isimciklerinin

).

ve RSV immunpozitif olgular

inkluzyon cisimciklerine

ilgili

enfeksiyon

ne, sekonder bakteriyel

, 116, 121, 138,

139)

(79, 101,139

PI3 de olgular *M. haemolytica*,
Mycoplasma spp., *Staphylococcus aureus* gibi bakterilerilerin

histopatolojik olarak

bakteriyel bir etkenle komplike ol

mmunohistokimyasal olarak,

enfeksiyonu %5.8, RSV %3.6 (75),

)

koyunlarda PI3

er ise

,

.

nulan

Bitlis-Van

),

(76)

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