

Anestezija prašičev

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Postopek pred anestezijo

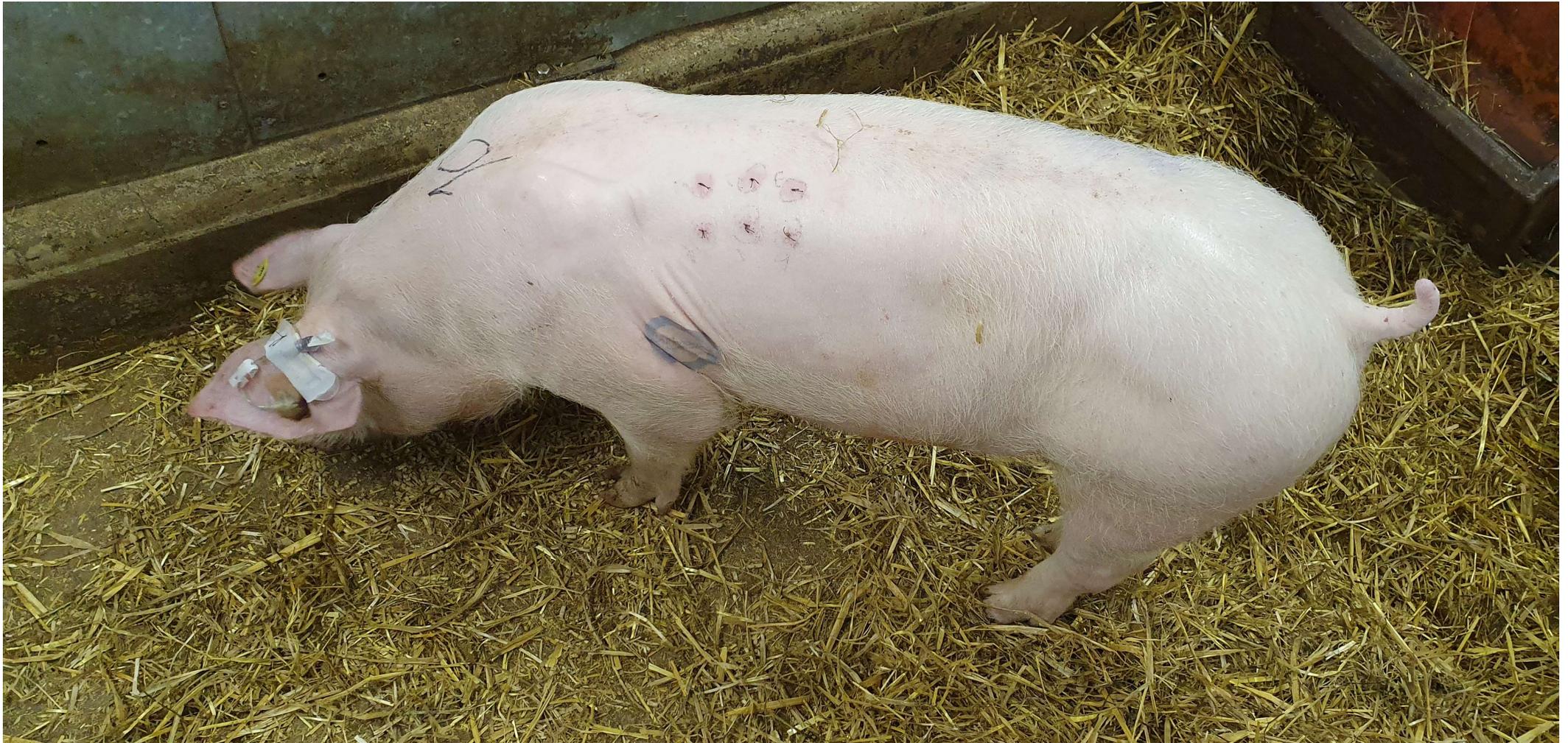
- Čredne živali
 - skupna vhlevitev (isto gnezdo – hierarhija)
 - vidni, slušni in taktilni kontakt
- Pred anestezijo jih čim manj vznemirjamo → nikoli ne anesteziramo neposredno po prevozu
- Intenzivna vokalizacija ob manipulaciji → sedacija pred posegom (npr. IV kateterizacija)

Skupna vhlevitev

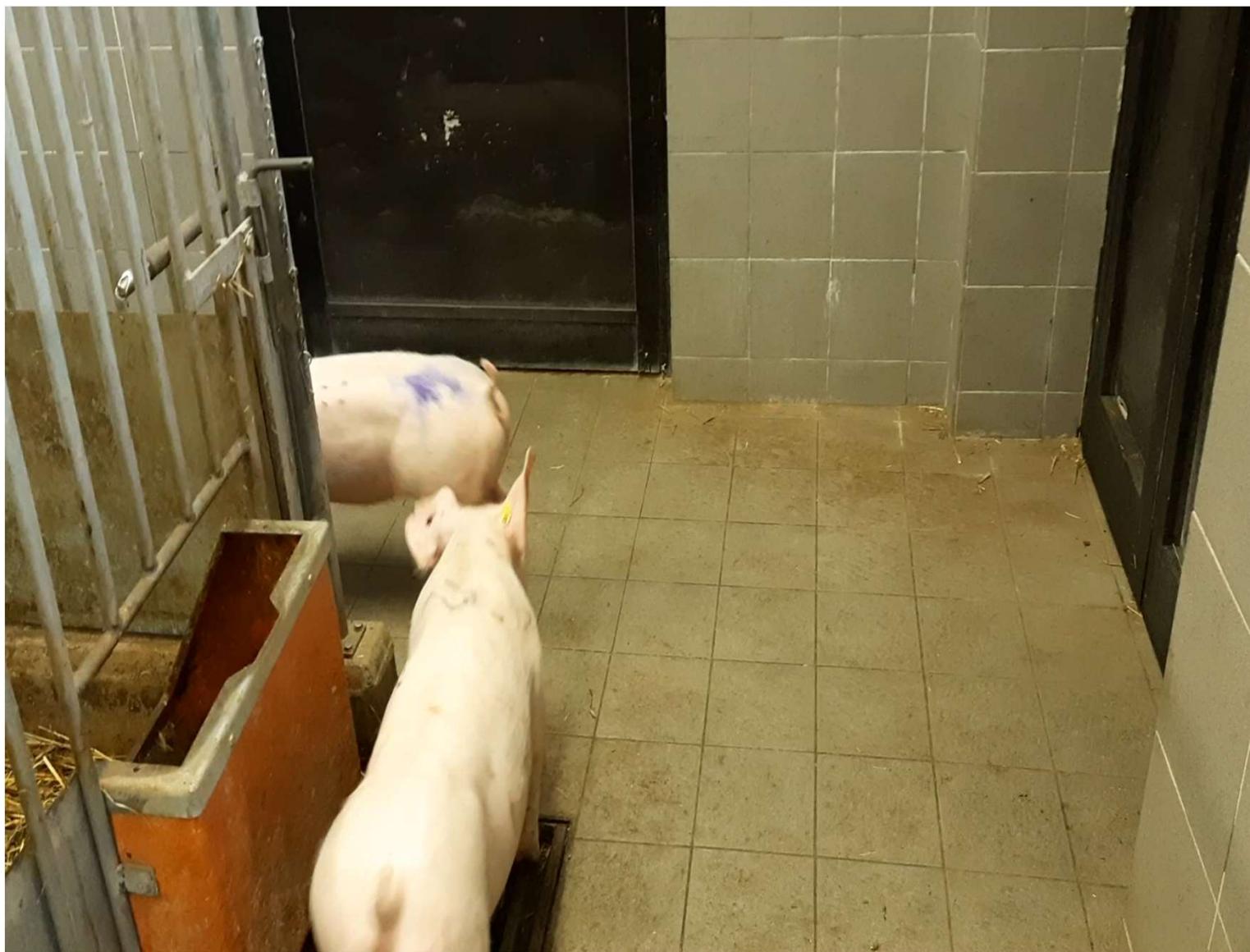


Individualna nastanitev

preprečiti odstranitev katetrov, obližev, šivov



Vidni, slušni, taktilni kontakt



Adaptacija 10 – 14 dni



Obogatitev okolja



Premedikacija/sedacija

- Globoko IM (maščoba v podkožju), vratne mišice
- Kombinacija disociativnih anestetikov in benzodiazepinov
 - \pm agonisti adrenoceptorjev α_2 (medetomidin, ksilazin)
 - \pm opioidi (butorfanol, buprenorfin, morfij)
 - \pm fenotiazini (acepromazin) – manj učinkoviti, preventiva MH

IM aplikacija



Kateterizacija

Vene

- marginalne ušesne vene → lateralna
običajno največja (veje kavdalne aurikularne
in superficialne cervikalne vene)
- cefalika
- safena

Arterije

- dorzolateralna ušesna
- stegenska

IV kanila – lat. ušesna vena



Antebrahialno področje

→ površinske vene



Stegenska arterija

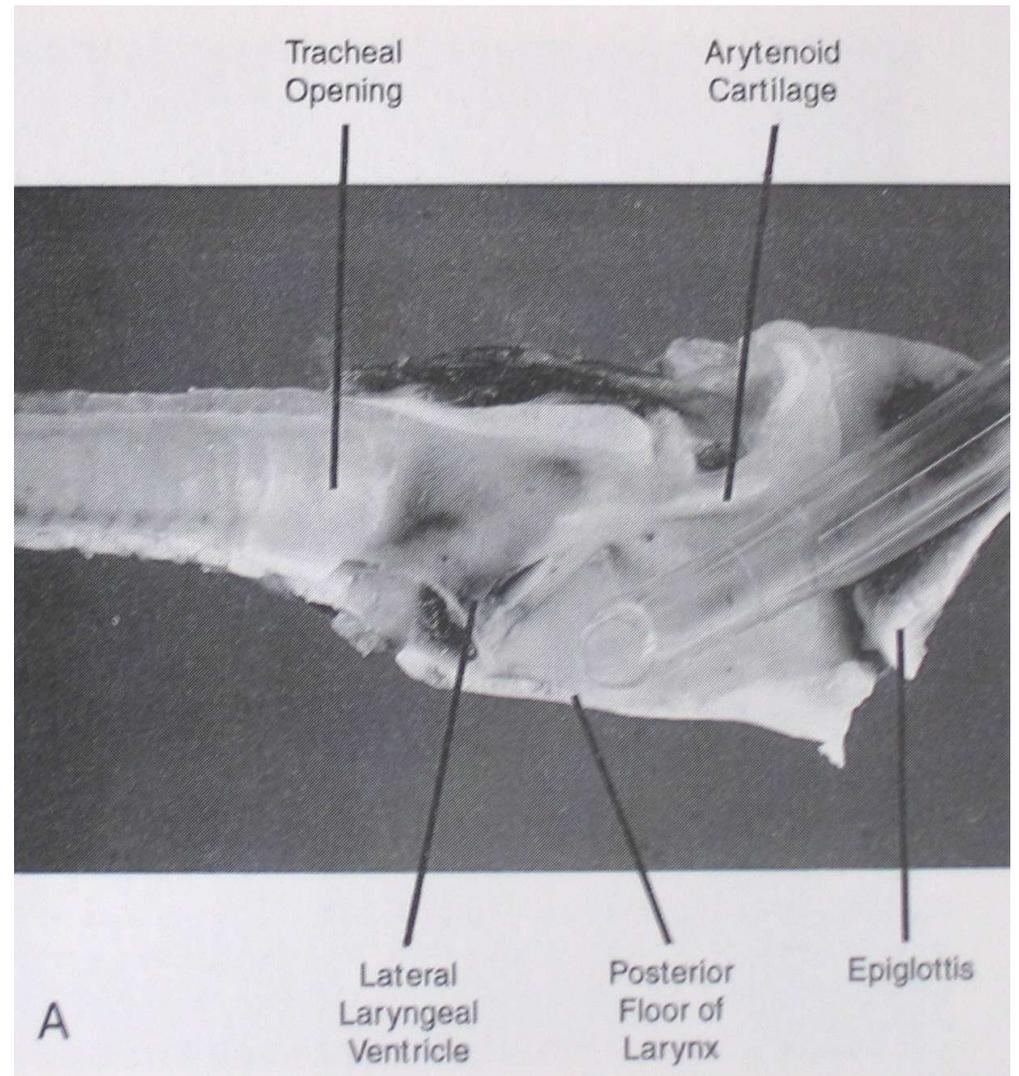
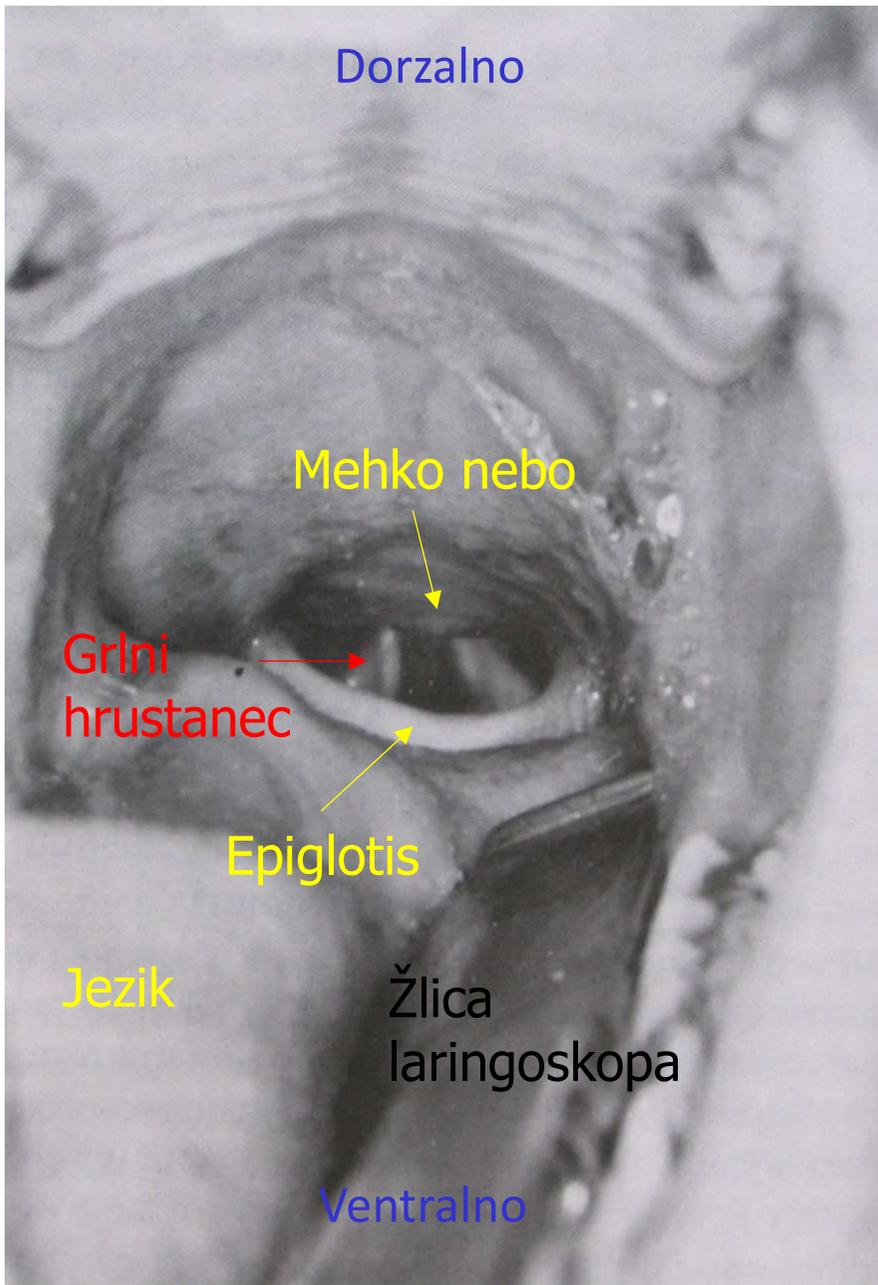
→ direktni arterijski tlak



Intubacija

- Specifična anatomija ustne votline in žrela
 - ozek, dolg gobec
 - grlo v obliki sifona
- Intubacija
 - direktna vizualizacija žrela
 - laringoskop s podaljšanim nastavkom (Miller 4 oz. njegove adaptacije)
 - vodilo
 - hiperekstenzija glave in vrata
- Majhen premer sapnika
 - 30 kg prašič tubus i.d. 6 do 7,5/8 (pes i.d. 11 do 14)





Uvod v AN, vzdrževanje AN

- Uvod v AN
 - ketamin + benzodiazepini
 - propofol
 - tiopental
 - inhalacijski anestetiki (obrazna maska)
- Vzdrževanje AN
 - inhalacijski anestetiki
 - Izofluran (MAK 1,45-2,04), sevofluran (MAK 1,97-2,66)
 - halotan \Rightarrow maligna hipertermija
 - + CRI analgetiki (fentanil/ketamin)
 - PIVA (fentanil + propofol)
- Nosilni plini: kisik, +/- zrak, +/- N₂O (optimalno FiO₂ 0,4)
- Krožni dihalni sistem (nad 5 kg tt)



WARNING
FACE AND RESPIRATORY TRACT PROTECTIVE EQUIPMENT
REQUIRED WHEN HANDLING THIS PRODUCT

PLJA 11/1

EKT 14 dni Datum: 26.10.2021
Anestzijski zapisnik in okrevanje Št. lista: ULIO

Ime:	Anamneza:	Temperament:	ASA Klasifikacija
Lastnik:	Klinične ugotovitve/rezultati/zdravila:	HR: RR:	I Brez organske bolezni
ID št. pacienta:		Kvaliteta pulza:	II Blaga sistemska bolezen
Vrsta živali:		Barva sluznic: CRT:	III Huda sistemska bolezen
Pasma:		Avskultacija toraksa:	IV Huda bolezen (ogroža življenje pacienta)
Starost: Spol:		Telesna temperatura: °C	V Moribunden pacient (čas preživetja < 24h) Dodaj "E" za urgentna stanja
Telesna teža: 25kg		ASA kategorija: T	
Anestezist: JS, AS			
Veterinar: VS, BT, TP			

Poseg(i): Resekcija v. portae (in v. lienales) elektrokoagul. v. cave in v. portae, klemnjenje, hamistekaja kože, Depilacija

Premedikacija	Odmerek	Pot	Čas	Anestzijski varnostni kontrolni seznam izpolnjen	Indukcija	Odmerek	Pot	Čas	
Ketamin	250mg	IV	15s			isofluran v O ₂	masa	30	
Fentanyl	0,35µg/kg	IV	10			1/10 + 30/min			
Midazolam	2mg	IV							

ET Tubus/Laringealna maska/Maska Velikost: F
Z mešičkom/brez mešička

Oči namazane z mazilom

Dihalni sistem: luarni Položaj pacienta: hrbtu
Ogrevanje pacienta: ručica, bledja, krpice

Telesna temperatura: 37,1 °C
Čas ekstubacije: 12,49

Navodila za OKREVANJE: Ugly hospital. list!
Zmerno/postopno ogrevanje z IR lučjo.

IV kateter Odstraniti po prebujanju Ohraniti vstavljenega in pripraviti

Pooperacijska tekočinska terapija

Pooperacijska analgezija	Monitoring med okrevanjem				
- fentanilski obliž 75 µg/h	Čas	T+0	T+15	T+30	T+45
- morfij	HR				
- karprofen	RR				
	Barva sluznic&CRT				
	Temperatura				
	Bolečinska lestvica				
	Drugo				

Pomembni podatki vpisani v pacientovo kartoteko

AVAV ASSOCIATION OF VETERINARY ANAESTHETISTS

Premedikacija IM

- Ketamin 10 mg/kg
- Medetomidin 0,015 mg/kg
- Midazolam 0,5 mg/kg

Indukcija

- Izofluran v O₂

Vzdrževanje AN

- Izofluran v O₂/zrak, FiO₂ 0,4
- CRI fentanil 10 – 20 µg/kg/h IV

+ Analgezija

- Karprofen 4 mg/kg IV (med OP) → 4 mg/kg/24 h PO 7 d
- Morfij 0,2 mg/kg/4 h pp 12 do 24 h
- Fentanil TD obliž 75 µg/h (3 µg/kg/h), 3 dni
- L-bupivakain SC ob incizijsko rano (opcija TAP blok)
- Maropitant 1mg/kg IV (↓ MAK hlapnega anestetika)

dobutamin: 3 ml/h = 5 µg/kg/min
 fentanil: 5 ml/h = 10 µg/kg/h

Nólven (ml/kg/h) 5 → 20 → → → STOP
 dobutamin 2,5 mg/ml (ml/h) 6 → → → 1,5 → → → STOP
 CRI fentanyl 50 µg/ml (ml/h) 10 → 5 → → 2,5 STOP

čas	15	20	25	30	35	40	45	50	55	01	10	15	20	25	30	35
Opombe								(#2)								
Etiso	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13
Iso insp.	14	14	14	14	14	14	14	14	14	13	13	13	13	13	13	13
FiO ₂	0,4	0,4	0,4	0,4	0,4	0,4	0,4	0,4	0,4	0,4	0,4	0,4	0,4	0,4	0,4	0,4
PIP (cm H ₂ O)	18	18	18	19	18	18	16	14	11	11	12	13	14	13	13	13
Tv (ml)	12	12	14	15	13	13	14	14	13	12	12	13	13	13	13	13
RL (ml/h)	100	150	→	→	→	→	→	→	→	→	→	→	→	→	→	→
Legenda PEEP (cmH ₂ O)	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
KOMPLIJANCA (ml/cmH ₂ O)	10	10	10	10	10	10	13	15	18	15	26	26	18	17	18	
HR																
RR																
IPPV																
SAP																
MAP																
DAP																
Doppler																
Palpebralni refleksi																
Tonus željasti																
-/+ / ++ / +++																
Položaj oči																
↓ / →																
Iso / Sevo	%	1,5	1,5	1,5	1,5	1,5	1,5	1,5	1,5	1,5	1,5	1,5	1,5	1,5	1,5	1,5
O ₂ / N ₂ O / Zrak	l/min	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
Palpebralni refleksi		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Položaj oči		↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓
Tonus željasti																
Kvaliteta pulza		+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
ETCO ₂	kPa/mmHg	53	53	53	55	56	55	54	53	53	53	53	53	53	52	52
SpO ₂ / sluz	%	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
Telesna temperatura	°C	37,7	37,7	37,7	37,7	37,7	37,7	37,7	37,7	37,7	37,7	37,7	37,7	37,7	37,7	37,7

Začetek posega: ▶ Konec posega: ◀
 Zaščita žrela z zloženci: Nameščena Odstranjena

Vol. krvi	Celokupni	_____ ml	Pes	
	10%	_____ ml		85ml/kg
	20%	_____ ml		Mačka/kunec
	30%	_____ ml	55ml/kg	

Opombe

Tempni, slienci, vatirani, teb. konvulzije		Ostri pripomočki	
Uporabljeni	Odstranjeni	Uporabljeni	Odstranjeni

AVA ASSOCIATION OF VETERINARY ANAESTHETISTS

SPV (mmHg) / / / / 2 2
 PPV (%) / / / / 5 5
 ↓ rektalno



DATUM			26.10.21			27.10.21		
URA			7	12	20	7	12	20
P	D	T						
180	70	41						
160	60	40						
140	50	39						
120	40	38						
100	30	37						
80	20	36						
60	10	35						
CRT			• 34,2°C					
SLUZNICE								
T E R A P I J A			Motylj 5 mg i/m 16.00 <input checked="" type="checkbox"/> 20.00 <input type="checkbox"/> 24.00 <input type="checkbox"/> → ni dobila?			04.00 <input type="checkbox"/> 08.00 <input type="checkbox"/> p.p. Rimadyl 100 mg p/o 8.00 <input checked="" type="checkbox"/>		
TEKOČINSKA TERAPIJA			PREVERI KANILO			PREVERI KANILO		
PREISKAVE			V poseg!			Pajave se driska, svetlo-rjava, smrdljiva, pov. frekvenca blatenja. Tujsa izgleda živahna, apetit ohranjen (8 ⁰⁰) → Nadaljuje oparovanje		
HRANA/VODA								
DIETA								
SPREHOD			7.00 DA/NE	14.00 DA/NE	20.00 DA/NE	7.00 DA/NE	14.00 DA/NE	20.00 DA/NE
URIN/BLATO								
VET. TEHNIK								
VETERINAR								
TELESNA TEŽA			25 kg					
OPOMBE								
DIAGNOZA								

Prebujanje



Ocenjevanje bolečine/analgezije

- Vedenjski vzorci
- Mimika obraza – obrazna lestvica (validacija)

ORIGINAL RESEARCH article

Front. Vet. Sci., 26 November 2018 | <https://doi.org/10.3389/fvets.2018.00299>



Use of Meloxicam or Ketoprofen for Piglet Pain Control Following Surgical Castration



Abbie V. Viscardi* and



Patricia V. Turner

Behaviors	Description
Suckling ^a	Teat in mouth and suckling movements
Nosing udder ^a	Nose in contact with udder, up and down head movements
Playing ^a	Springing (sudden jumping or leaping), head shaking, horizontal, or vertical bouncy movements with or without littermates
Agonistic ^a	Biting or fighting other littermates
Walking ^a	Moving forward at a normal pace
Running ^a	Moving forward at a rapid pace (trot or gallop)
Awake inactive ^b	No special activity, but awake
Sleeping ^b	Lying down, eyes closed
Nosing ^a	Snout in contact with a substrate
Chewing ^a	Nibbling at littermates or substrates
Trembling ^c	Shivering, as with cold
Spasms ^c	Quick and involuntary contractions of the muscles
Scratching ^c	Rubbing the rump against the floor, pen walls, or littermates
Tail wagging ^c	Tail's movements from side to side (or up and down)
Stiffness ^c	Lying with extended and tensed legs
Lying ^b	Body weight supported by side or belly
Sitting ^a	Body weight supported by hindquarters and front legs
Standing ^a	Body weight supported by four legs
Kneeling ^a	Body weight supported by front carpal joints and hind legs
Isolated ^{a,b}	Alone or with one littermate at most, distance of 40 cm separates the animal(s) from the closest group of littermates
Desynchronized ^{a,b}	Activity different from that of most littermates (at least 75%)

^aActive behaviors.

^bInactive behaviors.

^cCastration-related pain behaviors.

Vedenjski vzorci

- Aktivno vedenje
- Inaktivno vedenje
- Vedenje vezano na bolečino zaradi kastracije

The Piglet Grimace Scale

Ear Position

Absent (0)



In the baseline position, ears are both facing forward

Somewhat present (1)



One ear is in the baseline position and one ear is not

Moderately present (2)



Neither ear is in the baseline position; both ears are pulled back but not pressed against the body

Obviously present (3)



Both ears are pulled back and pressed against the body

- Determine ear position by looking at the base of the ear (point that connects to the piglet's head)

Cheek Tightening/ Nose Bulge

Absent (0)



Smooth transition from snout to cheek. No bump or bulge present.

Moderately present (1)



Slight bulge on the snout

Obviously present (2)



Prominent and noticeable bulge on the snout

- Determine nose bulge when the piglet's face is in profile view by looking above the lip line

Orbital Tightening

Absent (0)

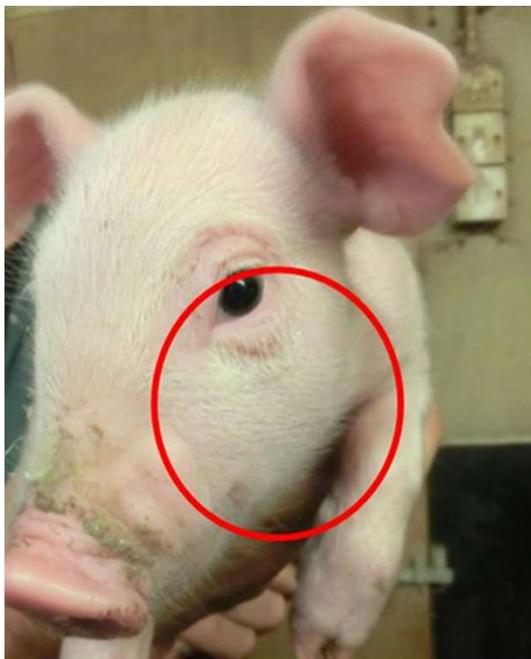


Eyes are bright and open

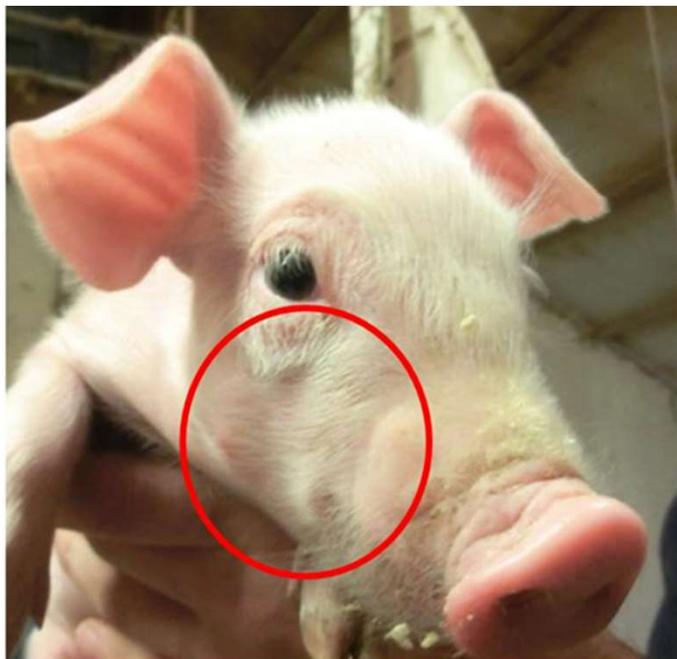
Present (1)



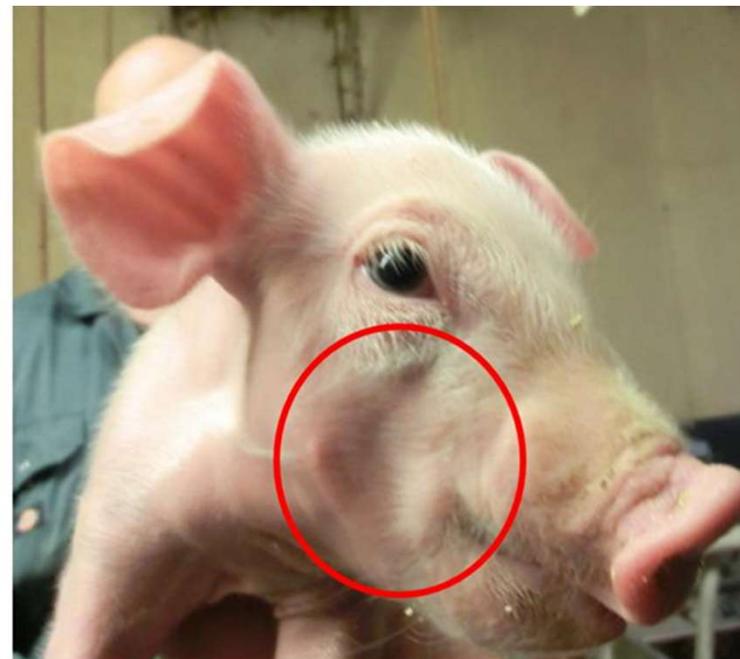
Orbital area is narrowed as the eyelids are squeezed together



0



1



2

Lonardi C et al. The 'Grimace Scale': do piglets in pain change their facial expression? Proceedings of the Joint Meeting of the 5th European Symposium of Porcine Health Management and the 50th Anniversary Meeting of the Pig Veterinary Society of Great Britain, Edinburgh, UK, 22nd – 24th May 2013.

Ocenjevanje bolečine/analgezije

- Vedenjski vzorci
- Lestvica za ocenjevanje akutne bolečine (validacija)

PLOS ONE

 OPEN ACCESS  PEER-REVIEWED

RESEARCH ARTICLE

Validation of the UNESP-Botucatu pig composite acute pain scale (UPAPS)

Stelio Pacca Loureiro Luna  , Ana Lucélia de Araújo , Pedro Isidro da Nóbrega Neto , Juliana Tabarelli Brondani ,
Flávia Augusta de Oliveira , Liliane Marinho dos Santos Azerêdo , Felipe Garcia Telles ,
Pedro Henrique Esteves Trindade 

Published: June 1, 2020 • <https://doi.org/10.1371/journal.pone.0233552>

Item	Score/criterion	Links to videos
Posture	(0) normal (any position, apparent comfort, relaxed muscles)	https://youtu.be/-loODGUwmS0
	(1) changes posture, with discomfort	https://youtu.be/V5zEiuJnF_g
	(2) changes posture, with discomfort, and protects the affected area	https://youtu.be/PAZplCKxuhk
	(3) quiet, tense, and back arched	https://youtu.be/qubgsQeoQ-8
Interaction and interest in the surroundings	(0) interacts with other animals; interested in the surroundings	https://youtu.be/OwbrMRogO-I
	(1) only interacts if stimulated by other animals; interested in the surroundings.	https://youtu.be/IPdIeVaeDIY
	(2) occasionally moves away from the other animals, but accepts approaches; shows little interest in the surroundings	https://youtu.be/kQ0gZ4CF5Zk
	(3) moves or runs away from other animals and does not allow approaches; disinterested in the surroundings	https://youtu.be/ZrHZZlIk7Q4
Activity	(0) moves normally	https://youtu.be/3_Rt3MT1pHE
	(1) moves with less frequency	https://youtu.be/IJdfz7KqApY
	(2) moves constantly, restless	https://youtu.be/cfET4CN4g0w
	(3) reluctant to move or does not move	https://youtu.be/X7_uDln8ih0b
Appetite	(0) normorexia	https://youtu.be/HWymAEgtaO4
	(1) hyperexia	https://youtu.be/QJ4z-TqDnjw
	(2) hyporexia	https://youtu.be/SNgFH5Yt-1A
	(3) anorexia	https://youtu.be/pYWA1VwSHYo
Attention to the affected area	A. elevates pelvic limb or alternates the support of the pelvic limb	https://youtu.be/ndrx0h_nc-Y
	B. scratches or rubs the painful area	https://youtu.be/qVkdWkdTjEk
	C. moves and/or runs away and/or jumps after injury of the affected area	https://youtu.be/RV0c3bIFdc
	D. sits with difficulty	https://youtu.be/Qq0e1CbRQYU
	(0) all the above behaviours are absent	
	(1) presence of one of the above behaviours	
	(2) presence of two of the above behaviours	
	(3) presence of three or all the above behaviours	
Miscellaneous behaviours	A. wags tail continuously and intensely	https://youtu.be/cfrD0bN5BK4
	B. bites the bars or objects	https://youtu.be/xyw9O14h9dg
	C. the head is below the line of the spinal column.	https://youtu.be/qKQRqY0hCY4
	D. presents difficulty in overcoming obstacles (example: other animal)	https://youtu.be/6ucHv8245N4
	(0) all the above behaviours are absent	
	(1) presence of one of the above behaviours	
	(2) presence of two of the above behaviours	
	(3) presence of three or all the above behaviours	

Vrednost pri kateri je potrebna aplikacija analgetika ≥ 6 od maksimalno 18 točk

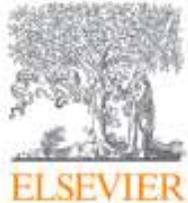
Analgetiki

Opioidi

- Butorfanol 0,1 – 0,3 mg/kg/4-6 h IM
- Buprenorfin 0,01-0,05 mg/kg/8-12 h IM, SC
- Morfij 0,2 mg/kg/4 h IM
- Fentanil CRI 30 – 50 $\mu\text{g}/\text{kg}/\text{h}$ IV, TD obliž 3-5 $\mu\text{g}/\text{kg}/\text{h}$
- Maropitant 1 mg/kg/24 h (visceralna analgezija) SC, 5 d

Nesteroidni analgetiki

- Karprofen 2-4 mg/kg/24 h PO, SC
- Meloksikam 0,4 mg/kg/24 h PO, IM, SC
- Fluniksin 1-4 mg/kg/24 h SC, IV



RESEARCH PAPER

Pharmacokinetics of carprofen in anaesthetized pigs: a preliminary study

Maša Bošnjak^a, Mojca Kržan^b, Urša Lampreht Tratar^a, Jožica Dolenc^c, Maja Čemažar^{a, d}, Alenka Seliškar^e



CASE REPORT article

Front. Vet. Sci., 24 November 2020 | <https://doi.org/10.3389/fvets.2020.611097>



Case Report: Intoxication in a Pig (*Sus Scrofa Domesticus*) After Transdermal Fentanyl Patch Ingestion

 Jerneja Sredenšek¹,  Maša Bošnjak²,  Urša Lampreht Tratar²,  Tina Kosjek^{3,4},  Maja Cemazar^{2,5},  Mojca Kržan⁶ and  Alenka Seliškar^{1*}

PO aplikacija karprofena



Odvzem krvi – PICC kateter 3R - izboljšava



Vprašanja?

