2021/2022

Univerza v Mariboru

Medicinska fakulteta

UČNI NAČRT PREDMETA / COURSE SYLLABUS	
Ime predmeta:	Anesteziologija in obravnava bolečine
Course title:	Anaesthesiology and pain management

Študijski program in stopnja Study programme and cycle	Študijska smer Study option	Letnik Year of study	Semester Semester
Splošna medicina, enovit magistrski študijski program		Četrti	8.
General medicine, Uniform master's degree study program		Fourth	8th

Vrsta predmeta (obvezni ali izbirni) / Course type (compulsory or elective)	obvezni compulsory
Univerzitetna koda predmeta / University course code:	

Predavanja Lectures	Seminar Seminar	Vaje Tutorial			Klinične vaje Clinical training	Druge oblike študija Other forms of study	Samost. delo Individual work	ECTS
		AV	LV	RV				
20	20				20		60	4

Nosilec predmeta / Course coordinator:	**prof. dr. Mirt Kamenik**

Jeziki /Languages:	**Predavanja / Lectures:**	slovenski/slovene
	Vaje / Tutorial:	slovenski/slovene

Pogoji za vključitev v delo oz. za opravljanje študijskih obveznosti:	**Prerequisites for enrolling in the course or for performing study obligations:**

Vsebina (kratek pregled učnega načrta):	**Content (syllabus outline):**
Priprava bolnika na anestezijo, pomen spremljajocih bolezni. Anestezijski dihalni sistemi in anestezijski aparat. Splošna anestezija: inhalacijski anestetiki, intravenski anestetiki, opijati in mišicni relaksansi. Splošna anestezija – postopki. Nadzor bolnika med anestezijo. Podrocna anestezija (subarahnoidna anestezija, epiduralna	Preparation of the patient for anaesthesia, the impact of concurrent disease. Anaesthesia breading circuits and the anaesthesia machine. General anaesthesia: inhalational anaesthetics, intravenous anaesthetics, opioids and muscle relaxants. Monitoring during anaesthesia. Regional anaesthesia (spinal anaesthesia, epidural anaesthesia, intravenous block, peripheral plexus block).

anestezija, intravenski blok, blokade živcnih pletežev). Nadomeščanje tekocin. Zapleti med anestezijo in po anesteziji. Dodatni postopki oživljanja. Enota intenzivne terapije - obseg dela in indikacije za sprejem. Zdravljenje s kisikom, umetna ventilacija indikacije in nacini predihavanja. Fiziologija in psihologija bolečine. Anamneza in pregled bolnika z bolečino. Akutna bolečina, pooperativna bolečina; vrste in načini zdravljenja. Vrste bolečine in metode zdravljenja kronične bolečine: bolečina zaradi raka, nevropatska bolečina, kronična bolečina, ki ni posledica raka.	Fluid management. Complications during and after anaesthesia. Advanced life support. Postoperative pain and methods for postoperative pain relief. Intensive care unit – the magnitude of work and indications for patient acceptance. Oxygen therapy, mechanical ventilation – indications and moods of ventilation. Physiology and psychology of pain. Anamnesis and examination of a patient with pain. Acute pain, postoperative pain; types and modes of treatment. Types of pain and treatment methods of chronical pain: pain due to cancer, neuropathic pain, chronical pain which is not a consequence of cancer.

Temeljni literatura in viri / Reading materials:

TEMELJNI VIRI

- GWINNUTT CL, GWINNUTT M. Clinical Anaesthesia: Lecture notes 5th ed. Wiley – Backwell Publishing 2016.
- . Cheng, Jianguo, Rosenquist, Richard W. (Eds.). Fundamentals of Pain Medicine 1st ed. 2018 Edition, - ISBN-13: 978-3319649207 ISBN-10: 3319649205

Slovenski reanimacijski svet - smernice za oživljanje (http://slors.szum.si/literatura/)

DODATNI VIRI

- Barash PG, Cahalan MK, CullenBF, Stock MC, Stoelting RK. Clinical Anesthesia 8th Edition. Wolters Kluwer Health 2017.
- Ballantyne JC, Fishman SM, Rathmell JP. Bonica's Management of Pain 5th Edition. Wolters Kluwer Health 2019.

Cilji in kompetence:

Seznaniti študenta medicine z področji dela anesteziologa (anestezija, perioperativna intenzivna terapija in terapija bolecine). Študent spozna pomen priprave bolnika na operacijo, delovanje anestetikov, izpeljavo vseh faz anestezije, vrednotenje podatkov neinvazivnega in invazivnega monitoringa, spozna ukrepe zdravljenja v enoti intenzivne terapije,
Ponovi temeljne in osvoji dodatne postopke oživljanja. Pridobiti osnovno znanje in veščine za diagnosticiranje in zdravljenje bolečine. Študent bo sposoben opraviti pregled bolnika z boleči no in jo opredeliti po vzroku, patofiziologiji, lokalizaciji in trajanju. Študent bo lahko ocenil bolečino, razumel njen vpliv na kakovost življenja bolnika in bo sposoben oceniti kateri načini zdravljenja so primerni za določeno vrsto bolečino. Študent se seznani z racionalnim načinom uporabe opijatov pri zdravljenju akutne in kronične bolečine, ter z drugimi metodami zdravljenja bolečine.

Objectives and competences:

To give the student an information about the field of work of an anaesthesiologist (anaesthesia, intensive care and pain therapy). The students will get the knowledge about the preparation of the patient for surgery, the mechanism of action of anaesthetics, management of anaesthesia, invasive and non-invasive monitoring during anaesthesia and in the intensive care, the methods of treatment of critically ill patients. The students will learn the methods of basic and advanced life support.
Acquiring basic knowledge and skills for diagnosing and treatment of pain. A student will be able to examine a patient with pain and identify pain according to its cause, pathophysiology, localization and duration. A student will be able to assess pain, understand its influence on the quality of a patient's life and will be able to assess which modes of treatment are appropriate for a certain type of pain. A student is acquainted with rational mode of the use of opiates in the treatment of acute and chronical pain and with other methods of pain treatment.

Predvideni študijski rezultati:

Znanje in razumevanje:
Predoperativni pregled in priprava bolnika na operacijo
Oskrba dihalne poti in algoritem za težko intubacijo
Dodatni postopki oživljanja odraslega in otroka

Intended learning outcomes:

Knowledge and Understanding:
Preoperative visit and the preparation of the patient for surgery.
Airway management and difficult airway algorithm

Anestezijski dihalni sistemi in anestezijski aparat
Inhalacijski anestetiki, intravenski anestetiki, opijatni analgetiki, mišični relaksanti, lokalni anestetiki
Venski dostop in nadomeščanje tekočin med anestezijo
Področna anestezija (spinalna anestezija, epiduralna anestezija, blokade pletežev, intravenska področna anestezija)
Rutinski in invazivni nadzor obtočil med anestezijo
Nadzor dihalnih plinov, mišične relaksacije in spanja med anestezijo
Zapleti med anestezijo in po anesteziji
Anestezija pri bolniku z boleznijo srca
Intenzivna terapija (postopki, indikacije za sprejem)
Zdravljenje s kisikom in ocena plinske analize arterijske krvi
Uporaba vazoativnih učinkovin

Študenti bodo spoznali pomen celostne obravnave bolnika z bolečino. Sposobni bodo pri bolniku ugotoviti vrsto in oceniti intenziteto bolečine, razumeti vpliv bolečine na kakovosti življenja. Študenti bodo usposobljemni uporabiti osnovne metode analgezije za doseganje učinkovite kontrole bolečine, klasificirati metode izbirnega zdravljenja po stopnjevalni shemi in oceniti učinkovitost zdravljenje bolečine. Delno bodo študenti usposobljeni za prepoznavanje in osnovno specifično obravnavo: akutne bolečine po poškodbi in operaciji, bolečine zaradi raka, nevropatske bolečine in kronične bolečine, ki ni posledica raka.

Prenesljive/ključne spretnosti in drugi atributi:
Veščine:
Predihavanje z dihalno masko in uporaba ročega dihalnega balona
Uporaba orofaringealnega tubusa, laringealne maske in orotrahealna intubacija
Vstavitev venske kanile
Odmerjanje zdravil med oživljanjem
Defibrilacija s polavtomatskim in klasičnim defibrilatorjem
Merjenje osrednjega venskega tlaka
Nekrvavo in krvavo merjenje krvnega tlaka
Vrednotenje pulznega oksimetra, kapnografije in plinske analize arterijske krvi
Faze splošne anestezije (uvod, vzdrževanje, zbujanje)
Spinalna in epiduralna anestezija anestezija
Uporaba kisikove jeklenke in prenosnega ventilatorja
Priprava in redčenje zdravil
Priprava in menjava infuzijske raztopin

Ocenjevanje vrste in intenzitete bolečine
Predpisovanje neopijatnijh in opijatnih analgetikov
Pomen področnih tehnik v zdravljenju akutne in kronične bolečine.
Ocenjevanje uspešnosti zdravljenja bolečine

Adult and paediatric advanced life support
Anaesthesia breading circuits and the anaesthesia machine
Inhalational anaesthetics, intravenous anaesthetics, opioids, muscle relaxants, local anaesthetics
Venous access and fluid management during anaesthesia
Regional anaesthesia (spinal anaesthesia, epidural anaesthesia, plexus blockade, intravenous regional anaesthesia)
Invasive and non-invasive cardiovascular monitoring during anaesthesia.
Monitoring of exhaled gasses, muscle relaxation and sleep during anaesthesia
Complications during and after anaesthesia
Anaesthesia in the patient with concurrent heart disease
Intensive care (treatment methods and indications for patient acceptance in the ICU)
Oxygen therapy and blood gas analysis
The use of vasoactive substances

Students will be acquainted with the meaning of comprehensive treatment of a patient with pain. They will be able to identify the type of pain in a patient and assess the intensity of pain, understand the influence of pain on the quality of life. Students will be qualified to use basic methods of analgesia for the achievement of efficient pain control, classify methods of optional treatment according to a graded scheme and assess efficiency of pain treatment. Students will be partially qualified for the recognition and basic specific treatment: of acute pain after injury and operation, of pain due to cancer, of neuropathic pain and of chronical pain that is not a consequence of cancer.

Transferable/Key Skills and other attributes:
Key Skills:
Artificial ventilation using a face mask and a self-inflating bag
The use of oropharyngeal tube, laryngeal mask and orotracheal tube
Intravenous line placement
Use of drugs during resuscitation
Defibrillation using an automatic or classical defibrillator
Measurement of central venous pressure
Invasive and non-invasive blood pressure measurement
The use of the pulse oxymeter, capnography and blood-gas analysis
General anaesthesia (induction, maintenance, awakening)
Spinal and epidural anaesthesia
The use of oxygen bottle and the use of a transport ventilator
Preparation of the drugs
Preparation and the exchange of intravenous fluid bottles

Assessment of type and intensity of pain.
Prescribing non-opiate and opiate analgesics.

	Meaning of field techniques in the treatment of acute and chronical pain. Success assessment of pain treatment.

Metode poučevanja in učenja:	**Learning and teaching methods:**
Predavanja Seminarji Praktične vaje Vaje na simulatorju	Lectures Seminars Practical training Simulator training

Načini ocenjevanja:	Delež (v %) / Share (in %)	**Assessment methods:**
Način (pisni izpit, ustno izpraševanje, naloge, projekt) ŠTUDIJSKE OBVEZNOSTI ŠTUDENTOV • Obvezna prisotnost na seminarjih • Obvezna prisotnost na vajah • Prisotnost na predavanjih vsaj 50% POGOJI ZA PRISTOP K POSAMEZNEMU PREVERJANJU ZNANJA Opravljene študijske obveznosti: - vaje - seminarji - predavanja - 50% prisotnost Pisni izpit Ustni izpit	 **80** **20**	Method (written or oral exam, coursework, project): ACADEMIC OBLIGATIONS OF STUDENTS Obligatory attendance at coursework Obligatory attendance at laboratory work Attendance at lectures at least 50% REQUIREMENTS FOR ACCESS TO INDIVIDUAL KNOWLEDGE CHECKING Completed academic obligations: - laboratory work - coursework - lectures – 50% attendance Written exam Oral exam

Reference nosilca / Course coordinator's references:

JOŠT, Anton, BLAGUS, Rok, BAN, Boris, KAMENIK, Mirt. Effect-site concentration of remifentanil during patient-controlled analgesia in labour. *International journal of obstetric anesthesia*, ISSN 0959-289X, Aug. 2015, vol. 24, iss. 3, str. 230-236. http://www.sciencedirect.com/science/article/pii/S0959289X15000734, doi: 10.1016/j.ijoa.2015.04.003. [COBISS.SI-ID 32092121].

JOŠT, Anton, BAN, Boris, KAMENIK, Mirt. Modified patient-controlled remifentanil bolus delivery regimen for labour pain. Anaesthesia, ISSN 0003-2409, Mar. 2013, vol. 68, issue 3, str. 245-252, ilustr. http://onlinelibrary.wiley.com/doi/10.1111/anae.12038/pdf, doi: 10.1111/anae.12038. [COBISS.SI-ID 4607039].

MOLLER PETRUN, Andreja, KAMENIK, Mirt. Bispectral index-guided induction of general anaesthesia in patients undergoing major abdominal surgery using propofol or etomidate : a double-blind, randomized, clinical trial. British Journal of Anaesthesia, ISSN 0007-0912, 2013, vol. 110, no. 3, str. 388-396, ilustr. http://bja.oxfordjournals.org/content/110/3/388.long, doi: 10.1093/bja/aes416. [COBISS.SI-ID 4593983].

ZORKO, Nuška, MEKIŠ, Dušan, KAMENIK, Mirt. The influence of the Trendelenburg position on haemodynamics: comparison of anaesthetized patients with ischaemic heart disease and healthy volunteers. Journal of international medical research, ISSN 0300-0605, 2011, vol. 39, no. 3, str. 1084-1089. http://www.jimronline.net/content/full/2011/103/1674.pdf. [COBISS.SI-ID 3997247].

MEKIŠ, Dušan, KAMENIK, Mirt. Influence of body position on hemodynamics in patients with ischemic heart disease undergoing cardiac surgery. *Wiener klinische Wochenschrift, Supplement*, ISSN 0300-5178, 2010, vol. 122, suppl. 2, str. 59-62, doi: 10.1007/s00508-010-1346-9. [COBISS.SI-ID 3667775].

KRČEVSKI-ŠKVARČ, Nevenka, KAMENIK, Mirt. Effects of pregabalin on acute herpetic pain and postherpetic neuralgia incidence. Wiener klinische Wochenschrift. Supplementum, ISSN 0300-5178, 2010, vol. 122, suppl. 2, str. 49-53, doi: 10.1007/s00508-010-1345-x. [COBISS.SI-ID 3668031].

ZORKO, Nuška, KAMENIK, Mirt, STARC, Vito. The effect of Trendelenburg position, lactated Ringer's solution and 6% hydroxyethyl starch solution on cardiac output after spinal anesthesia. Anesthesia and analgesia, ISSN 0003-2999, Feb. 2009, vol. 108, no. 2, str. 655-659. [COBISS.SI-ID 3399231], [JCR, SNIP, WoS do 15. 2. 2013: št. citatov (TC): 3, čistih citatov (CI): 2, normirano št. čistih citatov (NC): 1, Scopus do 1. 11. 2012: št. citatov (TC): 4, čistih citatov (CI): 3, normirano št. čistih citatov (NC): 1].
MEKIŠ, Dušan, KAMENIK, Mirt, STARC, Vito, JERETIN, Stojan. Cardiac output measurements with electrical velocimetry in patients undergoing CABG surgery : a comparison with intermittent thermodilution. *European journal of anaesthesiology*, ISSN 0265-0215, 2008, letn. 25, št. 3, str. 237-242. [COBISS.SI-ID 23646425],

MEKIŠ, Dušan, KAMENIK, Mirt. A randomised controlled trial comparing remifentanil and fentanyl for induction of anaesthesia in CABG surgery. Wiener Klinische Wochenschrift, ISSN 0043-5325, 2004, jg. 116, hft. 14, str. 484-488. [COBISS.SI-ID 1645887].

KAMENIK, Mirt, PAVER-ERŽEN, Vesna. The effects of lactated Ringer's solution infusion on cardiac output changes after spinal anesthesia. Anesthesia and analgesia, ISSN 0003-2999, Mar. 2001, vol. 92, no. 3, str. 710-714. [COBISS.SI-ID 699711].