FACULTY OF MEDICINE AND HEALTH SCIENCES

VAKGROEP FUNDAMENTELE EN TOEGEPASTE MEDISCHE WETENSCHAPPEN

HOE HERKEN IK DE ACUUT ZIEKE PATIËNT IN HET DAGZIEKENHUIS:

Opname of ontslag naar huis?

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UZ GENT

BAAS

WIE BEN IK

- Dr. Bas Bruneel, Anesthesie UZGent
- No relevant disclosures

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INLEIDING

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EPIDEMIOLOGIE

– Onverwachte opname na dagchirurgie: ongeveer 2-3%:

Locatie	Onverwachte opname (%)	Bron
Gent	2.81	(Van Caelenberg et al., 2018)
Canada	1.42-2.67	(Fortier et al., 1998; Whippey et al., 2013)
Chicago	2.5	(De Oliveira Jr et al., 2015)

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MORBIDITY AND MORTALITY IN AMBULATORY SURGERY

Quid?

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MAJOR MORBIDITY AND MORTALITY WITHIN 1 MONTH OF AMBULATORY SURGERY AND ANESTHESIA (WARNER ET AL., 1993)

- Majeure morbiditeit en mortaliteit binnen 30 dagen na ambulate chirurgie en anesthesie
- Tertiair centrum
- 38,598 patiënten & 45,090 narcoses

Table 1.—American Society of Anesthesiologists Physical Status Classification and Morbidity and Mortality*

Class	Description	No. of Patients (% Total)	No. of Morbidities†	No. of Deaths‡
I	Healthy patient	14 609 (32)	6	0
II	Mild systemic disease, no functional limitation	19 614 (43)	17	2
III	Severe systemic disease, definite functional limitation	10 867 (24)	8	0
IV	Severe systemic disease, constant threat to life	None	...	...
V	Moribund patient unlikely to survive 24 h with or without operation	None	...	...

*Data modified and reproduced with permission from Hosking et al.[12]
†See text for definitions.
‡Death within 30 days from medical complications.

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MAJOR MORBIDITY AND MORTALITY WITHIN 1 MONTH OF AMBULATORY SURGERY AND ANESTHESIA (WARNER ET AL., 1993)

- Mortaliteit in 4 patiënten (0.00009%)
  - 2 AMI
  - 2 auto ongevallen
- Morbiditeit in 31 patients (0.08%)
  - 14 AMI
  - 7 TIA/CVA
  - 5 Longembolen
  - 5 Respiratoir falen

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COMPARATIVE OUTCOMES ANALYSIS OF PROCEDURES PERFORMED IN PHYSICIAN OFFICES AND AMBULATORY SURGERY CENTERS (VILA ET AL., 2003)

- 2,326,249 procedures over 2 jaar
- Morbiditeit:
  - 123 incidenten of schade
  - 5.3 per 100,000
- Mortaliteit:
  - 18 deaths, 13 related to the procedure
  - 0.8 per 100,000

Table 3. 2000 Florida Ambulatory Surgery Center Deaths (n = 18)

Category	Surgical Procedure Code	Reported Injury Code
Ophthalmology	13.59 Extracapsular lens extraction, NEC	441.5 Aortic aneurysm—ruptured
Ophthalmology	13.59 Extracapsular lens extraction, NEC	427.5 Cardiac arrest
Otolaryngologic	28.3 Tonsillectomy/adenoidectomy	798 Sudden death, cause unknown
Endoscopy	42.92 Esophageal dilation	998.2 Accidental puncture or laceration
Endoscopy	43.11 Percutaneous endoscopic gastrostomy	998.89 Unspecified complication of procedure, NEC
Endoscopy	45.13 Small-bowel endoscopy, NEC	798.2 Death occurring in less than 24 h
Endoscopy	45.23 Flexible fiberoptic colonoscopy	799.1 Respiratory arrest
Endoscopy	45.23 Flexible fiberoptic colonoscopy	959.9 Unspecified site
Endoscopy	45.23 Flexible fiberoptic colonoscopy	998.9 Unspecified complication of procedure, NEC
Endoscopy	45.23 Flexible fiberoptic colonoscopy	959.9 Unspecified site
Endoscopy	45.25 Endoscopic biopsy of large intestine	997.1 Cardiac complications
Radiology	50.11 Percutaneous needle biopsy, liver	864.0 Injury of liver
General surgery	54.91 Percutaneous abdominal drainage	798.2 Death occurring in less than 24 h
Urology	62.3 Unilateral orchiectomy	798.2 Death occurring in less than 24 h
Gynecologic	69.02 D&C post delivery	998.2 Accidental puncture or laceration
Orthopedics	82.21 Excision lesion, tendon sheath, hand	425.4 Other primary cardiomyopathies
Plastic surgery	86.83 Size reduction plastic operation	998.9 Unspecified complication of procedure, NEC
Pain	99.99 Nonoperative procedure, NEC	427.5 Cardiac arrest

Abbreviations: D&C, dilation and curettage; NEC, not elsewhere classified.

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QUALITY IN AMBULATORY SURGERY

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OUTCOMES IN DAY SURGERY (SCHNAIDER AND CHUNG, 2009)

"…. perioperative mortality and moribidity … do not necessarily reflect the quality of care, but rather the overall health status of the patient population undergoing ambulatory surgery …"

- Cancellations and delays
- Adverse events
  - Cardiovascular (blood pressure abnormalities and arrhythmia)
  - Respiratory (reintubation, aspiration pneumonitis, pulmonary embolus)
  - Central or peripheral nervous system new deficit
  - Anaphylaxis
  - Possible malignant hyperthermia
  - Infection
  - Local anesthetic toxicity
- Prolonged postoperative stay
- Unanticipated hospital admission
- Return hospital visit and readmission
- Return to operating room
  - Unplanned postprocedural treatment in physician's office or emergency department
  - Unplanned admission to hospital or acute care facility
  - Cardiopulmonary arrest or death
- Postoperative patient function
- Patient satisfaction

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UNANTICIPATED ADMISSION

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ANALYSIS OF FAILED DISCHARGE AFTER AMBULATORY SURGERY: UNANTICIPATED ADMISSION (VAN CAELENBERG ET AL., 2018)

- 9100 patiënten (volwassenen en kinderen)
  - 6486 volwassenen
  - - 1007 meerdere ingrepen
  - - 57 geplande opname postoperatief
  - 5156 patiënten waarvan 145 onverwachte opnames
- Sociaal/organisatorisch > chirurgisch > anesthetisch > medisch

Table 1. Reasons for unanticipated admissions and delayed discharged.

Reason	Delayed discharge, *n* (%)	Admission, *n* (%)
Anesthetic reason	3 (9.7)	15 (10.34)
PONV	2 (6.5)	3 (2)
Delayed awakening		6 (4)
Urinary retention	1 (3.2)	5 (3.3)
Aspiration		1 (0.7)
Medical reason	1 (3.2)	8 (5.52)
Syncope		1 (0.7)
Cardio respiratory monitoring	1 (3.2)	3 (2)
Epileptic insult		2 (1.4)
Pulmonary embolism		1 (0.7)
Infection		1 (0.7)
Surgical reason	4 (12.9)	56 (38.62)
More extensive surgery needed	1 (3.2)	21 (14.48)
Surgical complication		1 (0.7)
Intractable pain	2 (6.5)	17 (11.72)
Re-operation		2 (1.4)
Bleeding	1 (3.2)	15 (10.34)
Social/organisational reason	23 (74.19)	66 (45.52)
Surgeon request		9 (6.2)
Late start OR	21 (67.74)	35 (24.14)
No home support		13 (9)
Patient request		8 (5.5)
Medication error		1 (0.7)
Waiting for results from examination	2 (6.45)	

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ANALYSIS OF FAILED DISCHARGE AFTER AMBULATORY SURGERY: UNANTICIPATED ADMISSION (VAN CAELENBERG ET AL., 2018)

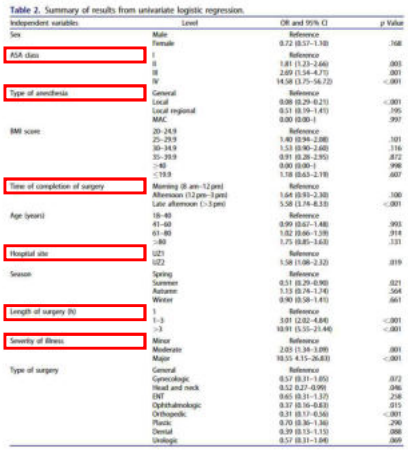

Table 2. Summary of results from univariate logistic regression.

Independent variables	Level	OR and 95% CI	p Value
Sex	Male	Reference	
	Female	0.72 (0.57–1.30)	.168
ASA class	I	Reference	
	II	1.81 (1.23–2.66)	.003
	III	2.69 (1.54–4.71)	.001
	IV	14.58 (3.75–56.72)	<.001
Type of anesthesia	General	Reference	
	Local	0.08 (0.29–0.21)	<.001
	Local regional	0.51 (0.19–1.41)	.195
	MAC	0.00 (0.00–1	.997
BMI score	20–24.9	Reference	
	25–29.9	1.40 (0.94–2.08)	.101
	30–34.9	1.53 (0.90–2.60)	.116
	35–39.9	0.91 (0.28–2.95)	.872
	≥40	0.00 (0.00–1	.998
	<19.9	1.58 (0.63–2.19)	.607
Time of completion of surgery	Morning (8 am–12 pm)	Reference	
	Afternoon (12 pm–3 pm)	1.64 (0.93–2.30)	.100
	Late afternoon (>3 pm)	5.58 (3.74–8.33)	<.001
Age (years)	18–40	Reference	
	41–60	0.99 (0.67–1.48)	.993
	61–80	1.02 (0.66–1.59)	.914
	>80	1.75 (0.85–3.63)	.133
Hospital site	UZ1	Reference	
	UZ2	1.58 (1.08–2.32)	.019
Season	Spring	Reference	
	Summer	0.51 (0.29–0.90)	.021
	Autumn	1.13 (0.74–1.74)	.564
	Winter	0.90 (0.58–1.41)	.661
Length of surgery (h)	1	Reference	
	1–3	3.01 (2.02–4.84)	<.001
	>3	10.91 (5.55–21.44)	<.001
Severity of illness	Minor	Reference	
	Moderate	2.03 (1.34–3.09)	.001
	Major	10.55 4.15–26.83)	<.001
Type of surgery	General	Reference	
	Gynecologic	0.57 (0.31–1.05)	.072
	Head and neck	0.52 0.27–0.99)	.046
	ENT	0.65 (0.31–1.37)	.258
	Ophthalmologic	0.37 (0.16–0.83)	.015
	Orthopedic	0.31 (0.17–0.56)	<.001
	Plastic	0.70 (0.36–1.36)	.290
	Dental	0.39 (0.13–1.15)	.088
	Urologic	0.57 (0.31–1.04)	.069

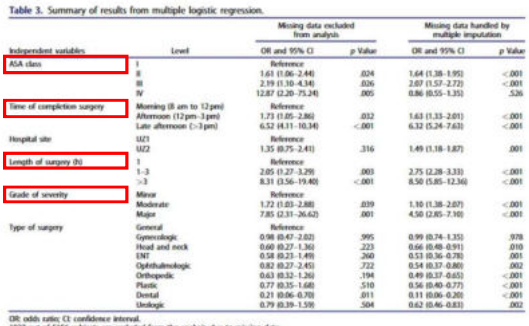

Table 3. Summary of results from multiple logistic regression.

Independent variables	Level	Missing data excluded from analysis: OR and 95% CI	Missing data excluded from analysis: p Value	Missing data handled by multiple imputation: OR and 95% CI	Missing data handled by multiple imputation: p Value
ASA class	I	Reference			
	II	1.61 (1.06–2.44)	.024	1.64 (1.38–1.95)	<.001
	III	2.19 (1.10–4.34)	.026	2.07 (1.57–2.72)	<.001
	IV	12.87 (2.20–75.24)	.005	0.86 (0.55–1.35)	.526
Time of completion surgery	Morning (8 am to 12 pm)	Reference			
	Afternoon (12 pm–3 pm)	1.73 (1.05–2.86)	.032	1.63 (1.33–2.01)	<.001
	Late afternoon (>3 pm)	6.52 (4.11–10.34)	<.001	6.32 (5.24–7.63)	<.001
Hospital site	UZ1	Reference			
	UZ2	1.35 (0.75–2.41)	.316	1.49 (1.18–1.87)	.001
Length of surgery (h)	1	Reference			
	1–3	2.05 (1.27–3.29)	.003	2.75 (2.28–3.33)	<.001
	>3	8.31 (3.56–19.40)	<.001	8.50 (5.85–12.36)	<.001
Grade of severity	Minor	Reference			
	Moderate	1.72 (1.03–2.88)	.039	1.10 (1.38–2.07)	<.001
	Major	7.85 (2.31–26.62)	.001	4.50 (2.85–7.10)	<.001
Type of surgery	General	Reference			
	Gynecologic	0.98 (0.47–2.02)	.995	0.99 (0.74–1.35)	.978
	Head and neck	0.60 (0.27–1.36)	.223	0.66 (0.48–0.91)	.010
	ENT	0.58 (0.23–1.49)	.260	0.53 (0.36–0.78)	.001
	Ophthalmologic	0.82 (0.27–2.45)	.722	0.54 (0.37–0.80)	.002
	Orthopedic	0.63 (0.32–1.26)	.194	0.49 (0.37–0.65)	<.001
	Plastic	0.77 (0.35–1.68)	.510	0.56 (0.40–0.77)	<.001
	Dental	0.21 (0.06–0.70)	.011	0.11 (0.06–0.20)	<.001
	Urologic	0.79 (0.39–1.59)	.504	0.62 (0.46–0.83)	.002

OR: odds ratio; CI: confidence interval.
1927 out of 5156 subjects are excluded from the analysis due to missing data.
The Hosmer–Lemeshow Goodness of fit test: p value = .777

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PREDICTIVE FACTORS OF HOSPITAL ADMISSION IN AMBULATORY SURGERY AT A REGIONAL HOSPITAL (LINARES GIL ET AL, 1999)

- Age was not significant for admission. ASA greater than status 1 (OR: 3.4 [1.4-9]); p = 0.01),
- Procto-perineo-sacrococcygeal procedures have significant risk (OR: 35 [4-304]; p < 0.00001)
- Surgical duration >40 min (OR: 22 [5-94]; p < 0.00001), pain (OR: 12 [3-55]; p < 0.00001) and vomiting (OR: 8.5 [1.2-59]; p = 0.03)

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PREDICTORS OF UNANTICIPATED ADMISSION FOLLOWING AMBULATORY SURGERY: A RETROSPECTIVE CASE-CONTROL STUDY (WHIPPEY ET AL, 2013)

- Unanticipated admission 2,67%
- Surgical 40%
  - length of surgery of one to three hours (odds ratio [OR] 16.70; 95% confidence interval [CI] 4.10 to 67.99)
  - length of surgery more than three hours (OR 4.26; 95% CI 2.40 to 7.55)
- Anaesthetic 20%
  - ASA class III (OR 4.60; 95% CI 1.81 to 11.68)
  - ASA class IV (OR 6.51; 95% CI 1.66 to 25.59)
- Medical 19%
  - advanced age (> 80 yr) (OR 5.41; 95% CI 1.54 to 19.01)
  - body mass index (BMI) of 30-35 (OR 2.81; 95% CI 1.31 to 6.04)
- Smoking (OR 0.44; 95% CI 0.23 to 0.83)
- MAC compared with GA (OR 0.17; 95% CI 0.04 to 0.68)
- plastic (OR 0.18; 95% CI 0.07 to 0.50), orthopedic (OR 0.16; 95% CI 0.08 to 0.33), and dental/ear-nose-throat surgery (OR 0.32; 95% CI 0.13 to 0.83) when compared with general surgery

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CONSENT AND ANAESTHETIC RISK (JENKINS AND BAKER, 2003)

- Postdischarge symptoms: 45% (6-95%)
- Postoperative pain
  - Major cause of delayed discharge, unplanned hospital admission and readmission.
  - 50% of patients still have significant pain at 24 h
  - > 80% are satisfied with their pain management
- Nausea (17%) and vomitting (8%)
- Sore throat
  - Tracheal intubation > laryngeal mask > facemask

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HERKENNEN VAN DE DETERIORERENDE PATIËNT

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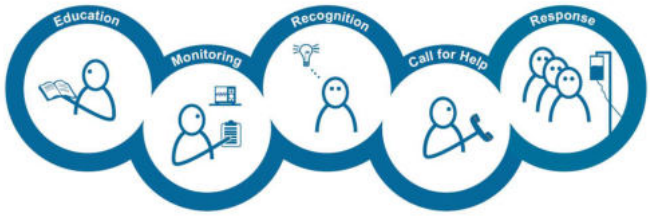
CHAIN OF PREVENTION

Figure 3.1
Chain of Prevention



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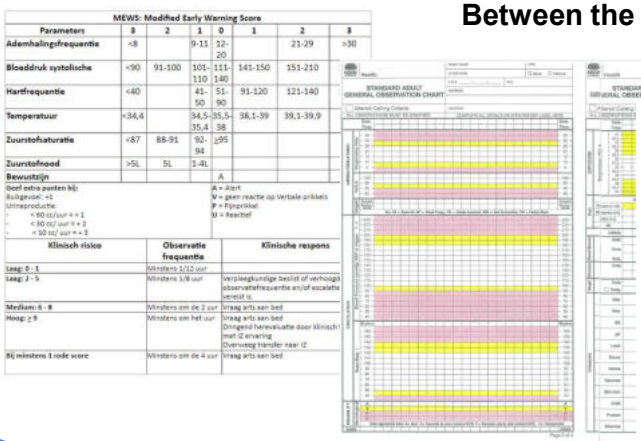
EARLY WARNING SCORES

Modified Early Warning Score

Between the flags



MEWS: Modified Early Warning Score

Parameters	3	2	1	0	1	2	3
Ademhalingsfrequentie	<8		9-11	12-20		21-29	>30
Bloeddruk systolische	<90	91-100	101-110	111-140	141-150	151-210	
Hartfrequentie	<40		41-50	51-90	91-120	121-140	
Temperatuur	<34,4		34,5-35,4	35,5-38	38,1-39	39,1-39,9	
Zuurstofsaturatie	<87	88-91	92-94	≥95			
Zuurstofnood	>5L	5L	1-4L				
Bewustzijn				A			

Geef extra punten bij:
Buikgevoel: +1
Uitreproductie:
- < 80 cc/uur = +1
- < 30 cc/ uur = + 2
- < 10 cc/ uur = + 3

A = Alert
V = geen reactie op Verbale prikkels
P = Pijnprikkel
U = Reactief

Klinisch risico	Observatie frequentie	Klinische respons
Laag: 0 - 1	Minstens 1/12 uur	
Laag: 2 - 5	Minstens 1/8 uur	Verpleegkundige beslist of verhoogde observatiefrequentie en/of escalatie vereist is.
Medium: 6 - 8	Minstens om de 2 uur	Vraag arts aan bed
Hoog: ≥ 9	Minstens om het uur	Vraag arts aan bed Dringend herevaluatie door klinisch i met IZ ervaring Overweeg transfer naar IZ
Bij minstens 1 rode score	Minstens om de 4 uur	Vraag arts aan bed

NEWS2

Chart 1: The NEWS scoring system

Physiological parameter	Score 3	2	1	0	1	2	3
Respiration rate (per minute)	≤8		9–11	12–20		21–24	≥25
SpO_2 Scale 1 (%)	≤91	92–93	94–95	≥96			
SpO_2 Scale 2 (%)	≤83	84–85	86–87	88–92 ≥93 on air	93–94 on oxygen	95–96 on oxygen	≥97 on oxygen
Air or oxygen?		Oxygen		Air			
Systolic blood pressure (mmHg)	≤90	91–100	101–110	111–219			≥220
Pulse (per minute)	≤40		41–50	51–90	91–110	111–130	≥131
Consciousness				Alert			CVPU
Temperature (°C)	≤35.0		35.1–36.0	36.1–38.0	38.1–39.0	≥39.1	

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ESCALATIE PROTOCOL

Table 3.2
Example escalation protocol based on early warning score (EWS)

EWS	MINIMAL observation frequency	Escalation	
		Recorder's action	Doctor's action
3-5	4 hourly	Inform nurse in charge	
6	4 hourly	Inform doctor	Doctor to see within 1 hour
7-8	1 hourly	Inform doctor Consider continuous monitoring	Doctor to see within 30 minutes and discuss with senior doctor and/or outreach team
≥9	30 minutes	Inform doctor Start continuous monitoring	Doctor to see within 15 minutes and discuss with senior doctor and ICU team

Table 3.3
Medical emergency team (MET) calling criteria

MET calling criteria	
Airway	Threatened
Breathing	All respiratory arrests Respiratory rate < 5 min^{-1} Respiratory rate > 36 min^{-1}
Circulation	All cardiac arrests Pulse rate < 40 min^{-1} Pulse rate > 140 min^{-1} Systolic blood pressure < 90 mmHg
Neurology	Sudden decrease in level of consciousness Decrease in GCS of > 2 points Repeated or prolonged seizures
Other	Any patient causing concern who does not fit the above criteria

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ABCDE EVALUATIE

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Airway	Look	Listen	Feel
Breathing	Look	Listen	Feel
Circulation	Look	Listen	Feel
Disability	Look	Listen	Feel
Exposure	Head	To	Toe

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QUICK ASSESMENT

- Herken wanneer onmiddellijke hulp vereist is
- Quick look – listen – feel
- Geen tekens van leven: start CPR

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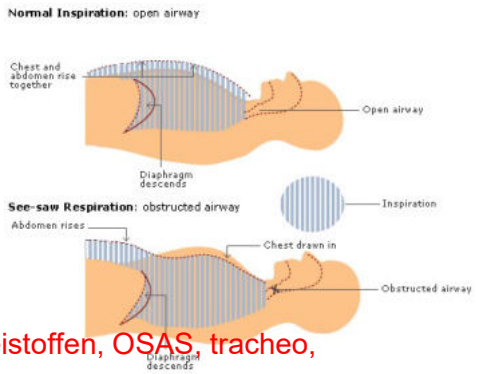
AIRWAY

1. Look for:
Paradoxale ademhaling
Cyanose
2. Listen for:
Stridor, borrelende geluiden
3. Feel for:
Airflow nose/mouth



Oorzaken: CNS depr, vreemd vwp, oedeem, vloeistoffen, OSAS, tracheo, anafylaxie

Behandeling: Roep hulp, suctie, LWmaneuvers, zuurstof

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AIRWAY: SEVERE ALLERGIC REACTIONS

Kliniek

Mond, lippen en tong zwellen
Moeilijke ademhaling met stridor en of wheezing
Rash of urticaria
Tachycadie en hypotensie

Behandeling

Roep hulp
Blijf de luchtweg monitoren en dien zuurstof toe
Dien adrenaline 0.5 mg IM toe
Start IV vocht in bolus
Laat de patiënt rechtop zitten

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BREATHING

Look, Listen, Feel for resp. distress:
Zweten, cyanose, hulpademhalingspieren, buikademhaling

1. Look:
Snelheid
Diepte, ritme, bilateraal opgaan van de borstkas
Zuurstofsaturatie > 94%, lager bij COPD
2. Listen:
Ausculteer: aan/afwezig, bijgeluiden
3. Feel:
Bilateraal opgaan van de borstkas, verplaatste trachea, emfyseem

Oorzaken: ernstige astma of COPD, longoedeem, (tensie)pneumothorax, hemothorax, restcurarisatie, opioïden, interscaleen blok

Behandeling: zuurstof, (niet-)invasieve ventilatie

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BREATHING: PNEUMOTHORAX

Kliniek

Hypotensie met moeilijke ademhaling en minstens 1 an de volgende:

- Gestuwde nekvenen
- Unilateraal afwezig ademgeruis
- Hyperresonantie bij percussie
- Trachea shift weg van de aangetaste zijde

Behandeling

Roep om hulp

Dien zuurstof en IV vocht toe

Naalddecompressie, thoraxdrain

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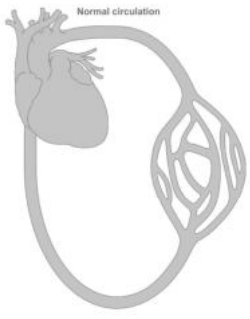
CIRCULATION

1. Look:
Kleur huid, nekvenen, vloeistofbalans, inclusief diurese en bloeding, capillaire refill
2. Listen:
Ausculteer: ruis, pericard wrijven of onhoorbaar
3. Feel:
Koud/warm, droog/nat, snelheid, ritme

Bloeddruk, 12-lead ECG, labos, bloedgas analyse

Oorzaken: hartfalen, myocardinfarct, hypovolemie, aritmie, tamponade

Behandeling: IV vochtbolus, trendelenburg, vasopressoren



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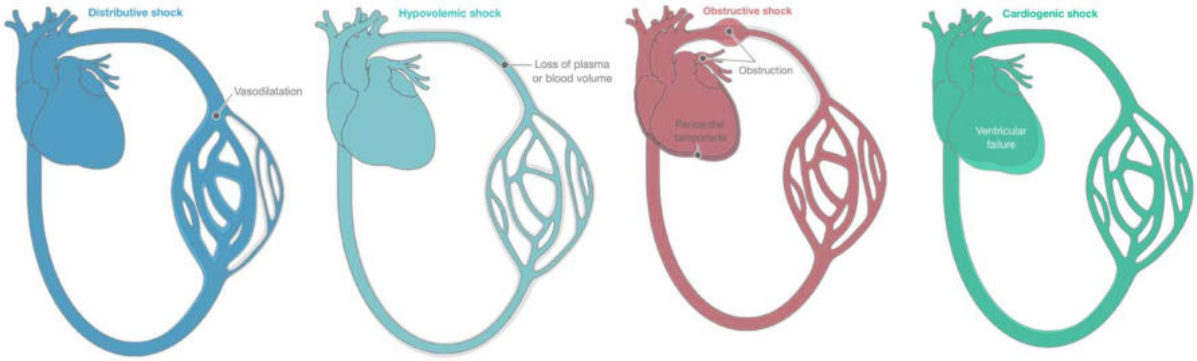
CIRCULATORY SHOCK (VINCENT AND DE BACKER, 2013)



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CIRCULATION: SHOCK

Kliniek

Tachycardie
Hypotensie
Tachypneu
Bleke en koude huid
Verlengde capillaire refill
Zweten
Duizelig, verward, bewustzijnsdaling

Behandeling

Roep om hulp
Trendelenburg positie
Geef zuurstof
Stop en controleer bloeding
Geef IV vocht bolus

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DISABILITY

1. Look:
PEARL, FAST, stuipen
2. Listen:
Verbaal
3. Feel:
Pijn of niet responsief

Controleer glycemie

Causes: hypoxie, hypercapnie,intoxicatie, sedativa of analgetica, hypoglycemie, CVA/TIA

Treatment: antagonist, glucose, recovery positie

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DISABILITY: HYPOGLYCEMIA

Kliniek

Zweten
Palpitaties
Hoofdpijn, veranderde mentale status
Geeuwen
Stuipen of convulsies
Areactief
Glycemie < 3.5 mmoL/L or 65 mg/dL

Management

Vraag om hulp
Geef zo snel mogelijk
– 10 g oraal, buccaal of 5 g IV
– Controleer na 10 minutes
Glucagon injectie 1 mg SC

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EXPOSURE

Head to toe:

Onbloot en onderzoek de patiënt

Zoek naar verborgen letsels, controleer de verbanden, zoek naar rashes

Meet de temperatuur

Ondervraag de patiënt of begeleider

Controleer de vitale parameters en medicatie

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CONCLUSIE

- Unanticipated admission is meer waarschijnlijk in patiënten met ernstige ziekte, hoge ASA score, langdurige en/of laat eindigende ingrepen
- Pijn, bloeding en meer uitgebreide chirurgie dan verwacht zijn de voornaamste redenen voor opname als we organisatorische redenen (45%!) buiten beschouwing laten
- Acuut zieke patiënten in ambulante chirurgie zijn zeldzaam, maar vereisen dezelfde aanpak als andere patiënten

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