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2022 Besedim congress 'it's all about imaging' – selected abstracts supplement

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2022 Besedim congress 'it's all about imaging' – selected abstracts supplement

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TOP ABSTRACTS

1. Extracorporeal cardiopulmonary resuscitation (eCPR) for refractory cardiac arrest: a retrospective study of prognostic factors

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Introduction: Extracorporeal cardiopulmonary resuscitation (eCPR) aims to restore organ perfusion during cardiac arrest not responding to standard resuscitation. The literature varies concerning prognostic factors for good neurological outcome after eCPR. The current study aims to further investigate potential predictors for good neurological outcome after eCPR.

Methods: This was a retrospective study from 2018 to 2020 in a tertiary university hospital. We included all patients with cardiac arrest who were referred to our hospital and who received eCPR. The outcome of interest was good neurological outcome after one year, defined as a Glasgow-Pittsburgh cerebral performance category (CPC) 1 or 2. On admission, we measured pH, base excess and lactate. Lactate was also measured after 6, 12 and 24 hours. We recorded the presence of gasping and prehospital transient return of spontaneous circulation (ROSC), no flow time (from arrest to first CPR) and low-flow time (time from start CPR to start eCPR). Lactate clearance was defined as: (initial lactate- lactate x h/initial lactate)*100 and calculated 6, 12 and 24 hours after admission. Transient ROSC was defined as ROSC, but with chest compressions restarted within 20 minutes after ROSC occurred. We compared these prognostic factors between the good neurological outcome and the poor neurological outcome groups.

Results: 52 patients were included (6 women and 46 men). Fifteen patients were discharged from intensive care, 10/52 (19%) survived one year with a good neurological outcome (CPC 1 or 2). We found a significant difference between both outcome groups for lactate clearance after 6 and 12 hours. Prehospital transient ROSC or gasping was present in all patients with good neurological outcome. There were no significant differences in age, low flow, base excess, initial pH and lactate between the good neurological outcome and the poor neurological outcome groups.

Discussion: Our results confirm earlier findings from Jung et al. who reported that lactate clearance was superior to single lactate measurements in predicting neurological outcome and findings by Jouffroy et al. that lactate clearance at 6 hours may predict mortality. Regarding transient prehospital ROSC or gasping, Debaty et al. suggested that the absence of signs of life can exclude candidates for eCPR when there is no shockable rhythm. Bunya et al. found that prehospital gasping was associated with a favourable neurological outcome in eCPR. Given these results, transient prehospital ROSC or gasping can be recommended as an inclusion criterion for eCPR, where lactate clearance can be a prognostic factor after initiation of eCPR. Because of the significant heterogeneity of patients with cardiac arrest, our results need confirmation in larger studies.

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2. Outcome and characteristics of patients presenting to the emergency department with respiratory symptoms during the first COVID-19 wave.

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Introduction: During the recent COVID-19 pandemic, a high proportion of patients presented to the emergency department (ED) with respiratory complaints, but not all of them were related to COVID-19. Our objective was to compare outcome and clinical characteristics between COVID-19 and non-COVID-19 patients presenting with respiratory symptoms during the first wave of the pandemic.

Methods: A retrospective observational study was conducted over the period of 1 March 2020–31 May 2020. All COVID patients with primary respiratory complaints were included and compared to a weekly randomized sample of patients with primary respiratory complaints without COVID-19. Primary outcomes (mortality, hospital admission, admission to Midcare/High care, length of hospitalization), demographic and disease characteristics were compared between the two groups. Chi-square or Fisher's exact test was performed to compare categorical variables between the COVID-19 and non-COVID group, continuous variables were analyzed with the independent sample t-test (or Mann-Whitney U-test in case of non-normal distribution). A two-tailed $p < 0.05$ was considered statistically significant.

Results: The total population consisted of 301 patients with primary respiratory complaints, 175 patients had a confirmed SARS-CoV-2 infection (COVID group) and 126 patients were considered as the non-COVID group. 14 patients (4.7%) died (12 (6.9%) in the COVID group vs 2 (1.6%) in the non-COVID group ($p = 0.032$). 103 patients in the COVID group (58.9%) and 45 patients in the non-COVID group (35.7%) were admitted to the hospital ($p < 0.001$). 67 patients in the COVID group (38.3%) and 8 patients in the non-COVID group (6.3%) were admitted to Midcare/High care ($p < 0.001$). The median length of hospitalization was 9 days (IQR 6–16) and 5 days (IQR 2–11) in the COVID and the non-COVID group, respectively ($p < 0.001$). Patients in the COVID group were older (55 (SD 22.56) years vs 44 (SD 19.06) years; $p < 0.001$) and consisted mainly of men (58.3% vs 37.3%; $p < 0.001$). Patients in the COVID group had more hypertension (29.7% vs 18.3%; $p = 0.023$), coronary artery disease (8.0% vs 2.4%; $p = 0.037$) and diabetes mellitus (15.4% vs 4.8%; $p = 0.003$), and were more likely to use ACE inhibitors (12.0% vs 4.8%; $p = 0.03$), oral antidiabetic agents (13.7% vs 4.8%; $p = 0.011$) and human insulin (6.3% vs 0.8%; $p = 0.016$). In the non-COVID group, there were more chronic respiratory (12.7% vs 5.7%; $p = 0.033$) and oncologic comorbidities (9.5% vs 2.3%; $p = 0.006$). On admission, there was a difference in vital signs between both groups for oxygen saturation levels at room air (95.5% (IQR 93.0–98.0) in the COVID vs 98.0% (IQR 95.0–99.0) in the non-COVID group; $p = 0.004$) and body temperature (36.9°C (IQR 36.4–37.4) in the COVID vs 36.6°C (IQR 36.3–36.9) in the non-COVID group; $p < 0.001$). Patients in the COVID group were likely to have a lower level of white blood cells (6.01 (IQR 4.48–7.85) vs 9.22 (IQR 5.82–12.95) x10E3/µL; $p < 0.001$) and lymphocytes (970 (IQR 560–1300) vs 1470 (IQR 735–2245)/µL; $p < 0.001$) and a higher level of ferritin (517 (IQR 195–1251) vs 142 (IQR 58–409) µg/L; $p < 0.001$), creatinine (0.97 (IQR 0.82–1.17) vs 0.80 (IQR 0.71–1.16) mg/dL; $p < 0.001$) and blood urea nitrogen (33 (IQR 0.71–1.16) vs 28 (IQR 21.0–42.0) mg/dL; $p = 0.036$). The CRP-level tended to be higher in the COVID group (66.9 (IQR 18.9–108.3) vs 55.1 (IQR 10.4–122.1) mg/L; $p = 0.228$). Regarding the arterial blood gas analyses performed at room air, patients in the COVID group had more respiratory alkalosis (62.7% vs 21.1%; $p < 0.001$) and hypoxemia (86.3% vs 57.9%; $p < 0.001$).

Discussion: Patients in the COVID group have a higher mortality, a higher proportion of Midcare/High care admission and a longer hospitalization duration than the non-COVID group. There is a clear difference between COVID and non-COVID patients presenting with respiratory complaints in terms of patient and disease characteristics. It seems unsurprising that previously described risk factors for (severe) COVID-19 (certain comorbidities and concomitant medications) are prominent in the COVID group. Patients in the COVID group are more respiratory-compromised as reflected by lower oxygen saturation levels, and higher numbers of respiratory alkalosis and hypoxemia.

3. A retrospective validation of COVID-19 referral criteria to the emergency department

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Introduction: The first COVID-19 wave in Belgium was observed from March until May 2020. An expert panel of the Ghent University Hospital created criteria for referring patients with suspected COVID-19 disease to the emergency department (ED) as a guidance for primary care physicians. The aim was to prevent ED overflow by unnecessary referrals. The referral criteria (Table 1) were created and implemented at short notice, based on the available information of COVID-19 at that time. The objective of this study was a retrospective validation of these criteria.

Methods: In this monocentric, retrospective study, 875 ED patients over 14 years of age were recruited by weekly random samples between March and May 2020. 309 patients matched the case definition of a suspected COVID-19 disease (Sciensano). The use of the referral criteria was evaluated for predicting hospital admission within this subpopulation by calculating the area under the ROC curve, odds ratio, sensitivity and specificity. In addition, a univariate and multivariate logistic regression analysis was performed for each criterion to evaluate their individual significance in predicting hospital admission. Modified referral criteria were developed by omitting criteria that were not significant in the logistic regression and adding new criteria that were significantly associated with hospital admission, based on the differences in characteristics between hospitalised and non-hospitalised patients using logistic regressions. For criteria based on a continuous variable, a Youden index was calculated to find an ideal cut-off value to divide the continuous variable into a categorical variable. Finally, the modified referral criteria were compared with the initial criteria using the area under the ROC curve, odds ratio, sensitivity and specificity.

Results: Analysis of the performance of the referral criteria to predict hospital admission resulted in an area under the ROC curve of 0.72, an odds ratio of 2.65 (95% CI of 1.64–4.27), a sensitivity of 60% and a specificity of 64%. Duration of symptoms, systolic blood pressure and clinical signs of dyspnea were nonsignificant predictors in the logistic regression analysis. The modified referral score was created removing those three criteria, adding the criterion age > 60 years, and setting a new cut-off value for saturation at 95%. This resulted in the modified referral criteria comprising of five variables (Table 2). The modified criteria showed an area under the ROC curve of 0.82, an odds ratio of 6.03 (95% CI 3.14–11.61), sensitivity of 80% and specificity of 68%.
Discussion: During a pandemic, clear hospital referral criteria should be established to prevent overflow of hospitals. To our knowledge, this is the first study to evaluate criteria for referring patients with suspected COVID-19 disease to the ED. Our results found that the initial referral criteria had a rather modest performance for predicting hospital admission. By altering the criteria to enhance their predictive ability, this resulted in modified criteria that are easy to use in a prehospital setting and have an improved performance. We expect that the sensitivity of the initial and modified criteria can be raised considerably by adding the referrer's 'gut feeling' as a criterion. Limitations of the study include its retrospective design and the inclusion of only patients presenting at the ED. Further study is needed to improve prediction performance and prospectively validate our results.

Table 1. Referral criteria.

Referral Criteria	Score*
Decreased saturation < 92%	1
Respiratory rate > 25/min	1
Duration of symptoms of 7 days or more	1
Clinical signs of dyspnea	1
Systolic blood pressure < 90 mmHg	1
Confusion	1
Presence of comorbidity	1

*Patients with a score ≥ 1 should be referred to a hospital.

Table 2. Modified referral criteria.

Modified Referral Criteria	Score*
Decreased saturation < 95%	1
Respiratory rate > 25/min	1
Confusion	1
Presence of comorbidity	0.5
Age > 60	0.5

*Patients with a score ≥ 1 should be referred to a hospital.

SELECTED ABSTRACTS

4. Evaluation of VA-ECMO implantation in patients suffering refractory cardiac arrest: a case-series

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Introduction: The aim of this monocenter case-series was to evaluate the implementation of veno-arterial extracorporeal membrane oxygenation (VA-ECMO) in patients suffering refractory cardiac arrest, to possibly identify factors associated with hospital mortality.

Design and methods: We retrospectively reviewed all patients treated with ECPR over a period of 3 years at the Imelda Hospital in Belgium (B3 cardiac center). Demographic data were collected and factors possibly associated with hospital mortality were analyzed.

Results: Following a multidisciplinary approach algorithm, 14 patients had been identified as eligible for ECPR and underwent emergent implantation of VA-ECMO. This consisted of 8 OHCAs (57.1%) and 6 IHCAs (42.9%). The mean age was 48 years and 12 patients (85.7%) were male. Causes of cardiac arrest were primary cardiac diseases (n = 8), respiratory diseases (n = 2), intoxication (n = 1) or unknown (n = 3). At least seven patients (50%) had a shockable rhythm (4 non-shockable, 3 unknown). VA-ECMO could successfully be explanted in five patients (35.7%), of which 3 (21.4%) survived to hospital discharge. All three survivors underwent additional in-hospital interventions (i.e. LVAD, IABP or PCI) and had better blood gas analysis results directly after arrest (pH = 7.18 ± 1.01, lactate 8.93 ± 9.73) compared to non-survivors (pH = 6.88 ± 0.14, lactate 17.02 ± 3.41). In addition, the mean pCO2 was remarkably lower in survivors (37.63 ± 10.02) than in non-survivors (79.63 ± 10.02). All survivors had a CPC score of 1 and no deaths occurred after discharge.

Discussion: We reported our experience over the last 3 years on ECPR for refractory IHCA and OHCA. By using VA-ECMO, we were able to save 3 out of 14 patients (CPC of 1). Interestingly, we observed markedly lower pCO2 values at time of arrest in survivors than in non-survivors, which might be an indication for sufficient remaining cardiac pump activity at time of VA-ECMO implantation (whereas higher pCO2 values could indicate a low cardiac output state). Future studies should further investigate the association between pCO2 and ECPR survival, to improve selection criteria and thereby patient outcome.

5. Cost-effectiveness of extracorporeal cardiopulmonary resuscitation (eCPR) in out-of-hospital cardiac arrest: a retrospective study

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Introduction: Extracorporeal cardiopulmonary resuscitation (eCPR) is a time- and resource-intensive therapy. Only one small randomised controlled trial (Yannopoulos et al.) showed improved survival compared to standard Advanced Life Support. The current study evaluated the cost-effectiveness of eCPR for out-of-hospital cardiac arrest (OHCA) patients.

Methods: Single-centre retrospective cohort study. We included all patients who were admitted to the emergency department (ED) of Antwerp University Hospital from 2018 to 2020 and who received eCPR therapy for OHCA. Medical records were assessed to determine clinical outcome and invoices were assessed to calculate the charged fees. We used micro costing which means collecting all relevant cost components at the most detailed level. To determine the cost to save one patient with good neurological outcome (Cerebral Performance Category (CPC) 1 or 2 after one year), we divided the total cost of all patients by the number of patients with this outcome.

Results: Sixty-five patients who received eCPR therapy for OHCA were included (mean age 50 years). Fifty-one patients (78.5%) had a witnessed arrest and received bystander CPR. Forty-eight percent showed signs of life prehospital. The initial rhythm was ventricular fibrillation in 43% and pulseless electrical activity in 31%. Thirty-eight patients (58%) died within one week after placement of the eCPR. After one year 18.5% (12/65 patients) were alive of which eight patients (12.3%) had a CPC of 1, two patients (3.1%) a CPC of 2 and two patients (3.1%) a CPC of 3. The mean charged fee per patient was39269euro. Of the total fee 42% was composed of 'nursing', 11% of 'use and maintenance of eCPR' and 10% of 'medication'. Patient and community paid255250euro to save one patient with good neurological outcome after one year.

Discussion: This study reports an overall one-year survival rate of 18.5% which is in line with previous studies. In the literature, the eCPR costs per patient range from 46657 to 140172 euro. Our mean charged fees per patient were rather low compared to the literature. The difference could be explained by the fact we used micro costing whereas previous studies mainly estimated the cost for the hospital itself by ways of macro costing, resulting in wider margins of error. Furthermore, it is difficult to compare the real cost of patient care between countries because of the differences between healthcare systems. Finally, improved patient selection may help avoiding futile application of eCPR thereby redirecting costs to patients with a good prognosis.

6. B-CAR: The Belgian cardiac arrest registry. 5 years of data from January 2017 to December 2021.

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Introduction: Out-of-hospital cardiac arrest (OHCA) is a health issue of relevance for Emergency physicians. Its frequency in Europe is estimated between 55 and 112 cases per 100.000 inhabitants per year. Registries plays a key role in advancing resuscitation science for cardiac arrest being an hypothesis generation tool for further research and a benchmarking tool for participating institutions. Moreover, registries allow to monitor and evaluate policy decisions as well as their implementation. B-CAR was started in Belgium in 2017 on these premises. In October 2017, the Belgian's register participate to the European registry EuReCa 2 and contributed to better understand circumstances and incidence of cardiac arrest in Europe.

Materials and Methods: From 2017, 20 Centers adhered to the registry which is a secured online platform allowing for structured data coding. Automatic extractions via Elastic search and Kibana platform allow real-time statistic extractions and data quality checks.

Results: From 2017 to dec 2021, 18 centers included 4385 patients. 12 centers encoded OHCA all year long. In 2020, due to the Covid pandemic, enrollement was temporarily halted between March and June. Nonetheless, seven centers encoded on the spot or after the crisis during those months. Patients mean age is 65 years, 65.7% of whom are males. 12% were not reanimated. Cardiac arrest encours at home in 68.9% of cases, is witnessed in 65,9% and has a shockable rythm in 20,2% cases. Family member 50,9% are the most frequent witness. Bystander CPR is initiated in 46,9%. 40.6% bystander CPR are initiated by a family member. Phone CPR is administered to the patient with phone support in 28.4% of cases. 28,9% of patients for

whom a CPR was initiated had ROSC, 43,03% were admitted to hospital. 11,04% were alive at hospital discharge and 9,6% 30 days after CA. Missing, incomplete or inaccurate data were detected after revision in 5,8% of records. 104 CA (2,3%) happened in children (aged from 0 to 15 years old). 51% whom were in males and 4 (3,8%) had a ROSC before ALS arrival. 64,4% happened at home, 18,3% happened in public places, 9,6% happened in schools (including pre-school). 51,9% were witnessed and in 46,3% of the cases the witness was a family member. For 67% of children in CA a phone CPR was performed. 5,8% (6) were in a shockable rhythm and were treated by defibrillation. 30,8% had ROSC, 88,5% of whom were admitted alive to hospital. 19,2% were alive at hospital discharge and 14,4% were alive 30 days after CA. 5,8% (6) outcomes at 30 days are missing. Children in cardiac arrest are initially bagvalved and then intubated ventilated in 64,4%. Most of them are perfused through an intraosseous line 63,3%.

Conclusion: These results offer a snapshot of the activity of B-CAR during its first five years. Further enrolling of new centers, continuous data encoding and quality completion of the CRF are the next challenges to allow quality research and constant monitoring of health policy.

7. Assessment of the nature and urgency level of medical problems by the 112 dispatcher versus triage nurse.

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Background: Hundreds of people rely on the prehospital ambulance system in Belgium on a daily basis. Our 112 central dispatchers have the important responsibility of deciding which protocol most suits the complaints of the patient, and which urgency level has to be assigned. Unfortunately, it is impossible for dispatchers to know whether the right resources were sent out and whether the most appropriate medical protocol was chosen. In this retrospective cohort study the allocated resources and medical protocols were analysed for correctness to optimize future use of emergency resources.

Methods: All patients who were directed to the Emergency Department (ED) of the University Hospital of Leuven by the 112 dispatch centre in the year 2019, and for whom the medical protocol, resources used, triage note and ESI score were available, were eligible for inclusion. First, the urgency level of the patient was investigated by comparing the sent out resource to the triage score assigned to the patient by the triage nurse upon arrival at the hospital using the ESI triage system. The potential resources for transport were: ambulance, ambulance and ED nurse (PIT) or ambulance, ED nurse and ED physician (MUG). In the second phase, the medical protocol used by the 112 dispatcher was compared to the triage notes of the triage nurse.

Results: From all 6980 patients transported to the ED of Leuven in 2019, 5521 were included in the analysis. For 64.0% of all included patients the urgency level allocated by the dispatcher and the triage nurse matched. In 3.7% of the patients, the used resources were too highly qualified. In 32.3% of all patients, the used resources were underqualified when compared to the ESI score given to the patient by the triage nurse. Looking closer, there is a significant difference in over- and undertriage in the used resources. In the MUG-category, in 8.5% of all patients, the used resources were over-qualified. In the PIT-category, we see 9.7% overqualified resources and 4.1% underqualified resources. In all sent out ambulances, 44.5% was underqualified when comparing to the urgency level in-hospital. Overall, in 59.6% of the calls, the medical protocol used by the dispatcher matched the triage note in the ED. In 38.9% of all calls, the used protocol and triage note did not match, or the triage note matched a different, more specific, protocol. While in 1.5% the triage notes did not match or were too vague to be categorized under a specific protocol.

Discussion: Emergency dispatchers are limited to the information they receive from the caller to decide which protocol and which resources are most fit for the patient. This can lead to over- or undertriage of the urgency level of the patient. Nationwide education of the population could benefit greatly. From this retrospective cohort study, we can conclude that there is room for a bigger role for the PIT in the prehospital setting. However, we have to be cautious with these findings, because they are subject to interpretation and are operator and/or nurse dependent. A more widespread study might be necessary to support these findings.

8. Antibiotic susceptibility of Escherichia coli strains in an emergency department population with urinary tract infection.

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Introduction: Antibiotics resistance is a major public health problem, increasing during the last decade [1]. Monitoring the susceptibility of bacteria allows the identification of new pathogens and highlights the necessity to refine local treatment guidelines and approaches for controlling antimicrobial resistance [2]. This emerging problem also involves Escherichia coli (E. coli) in urinary tract infection (UTI) [1,3]. Ciprofloxacin, a common antibiotic (AB) to treat UTI at home, is showing increasing resistance. The present study aimed to analyse the susceptibility of E. coli in urinary tract infection in an adult emergency department (ED) population.

Methods: We performed a retrospective study analyzing the UTI detected in an ED in Brussels during 2021. We included every adult with symptoms of UTI with a positive E. coli urine sample (cut-off ≥ 100,000 CFU/mL). Patients with 2 or more different bacteria species were excluded to avoid the influence of contaminations. The susceptibility of E. coli was tested for Ampicillin (AMP), Amoxicillin-Clavulanic Acid (AMC), Ciprofloxacin (CIP), Temocillin (TEM), Nitrofurantoin (NF), Fosfomycin (FOS) and trimethoprim/sulfamethoxazole (SXT) using EUCAST breakpoint tables. Differences between the following groups were analyzed: age, sex, need for hospitalisation, diagnosis, previous antibiotherapy in the last 6 months and previous urological procedure. Results were statistically analyzed with Fischer's Exact Test.

Results: 588 E. coli positive samples from symptomatic patients with a UTI diagnosis were analyzed, selected out of a total of 11.197 samples. Antibiotic susceptibility of E. coli to NF, FOS SXT and TEM was 98, 98, 87 and 99%, respectively, while E. coli exhibited lower susceptibility to AMP (53%) and AMC (63%). E. coli showed slightly decreased susceptibility to CIP (80%).

E. coli susceptibility to AMP, AMC and CIP was significantly lower in males (n = 121) compared to females (n = 467) ($P < 0.0005$). Previous antibiotherapy in the last 6 months (n = 109) compared to un-treated patients (n = 479) significantly decreased E. coli susceptibility to AMP (32% versus 58%, $P < 0.0001$), AMC (42% versus 68%, $P < 0.0001$) and CIP (62% versus 87%, $P < 0.0001$) and slightly affected susceptibility to SXT (80% compared to 89%, P 0.016).

Among male patients, a recent urologic procedure (n = 15) tended to decrease the susceptibility to CIP (from 69% to 47%) and to TEM (from 100% to 93%) without reaching statistical significance. Among females, susceptibility to AMP, AMC and CIP tended to be higher in patients under 55 years of age but the difference did not reach statistical significance. The severity of the affection (pyelone-phritis, n = 155, versus cystitis, n = 312) did not significantly modify E. coli susceptibility.

Susceptibility to NF, FOS, TEM was not different between the different groups and remained higher than 98% in all groups, except for TEM in men submitted to recent urologic procedure.

Conclusion: The present study shows the importance of resistance of E. coli to Ciprofloxacin and Amoxicillin-Clavulanic Acid in an adult UTI ED population, especially when antibiotherapy has been applied pre-viously.

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9. Accidental carbon monoxide intoxication from waterpipe smoking: a case report

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Introduction: Waterpipe smoking may increasingly account for unintentional carbon monoxide poisoning. Water-pipe smokers are exposed to a huge amount of carbon monoxide (CO) as much as one hundred times more than cigarette smokers.

Carbon monoxide intoxication is an important diagnosis in the emergency department (ED). However, CO poisoning due to waterpipe smoking may be unrecognized. We present a case of accidental carbon monoxide poisoning from waterpipe smoking.

Case presentation: a forty-eight-year old woman was brought by ambulance to the emergency department (ED) after presenting an episode of loss of consciousness and vomiting. When she arrived in ED, she had no more symptoms. Her vital signs were within normal limits. Diagnosis work up was negative and included orthostatic testing, blood samples (glycemia), electrocardiogram, computed-tomography cerebral imaging. Finally, an arterial blood gas sampling provided the diagnosis: carboxyhaemoglobin level was 20.9%. She received High-flow normobaric oxygen therapy for six hours. She was discharged without further complications.

Conclusion: this case highlights the increasing rule of water pipe smoking in CO intoxication. ED medical staff should be aware of this pathology and consider carbon monoxide poisoning in patients with waterpipe smoking history, to provide proper treatment and reduce the risk of complications. Secondary, this case shows the importance of investigations facing a loss of consciousness. Public health measures should discourage waterpipe use by highlighting the health risks.

10. Pancreatitis associated Leriche syndrome

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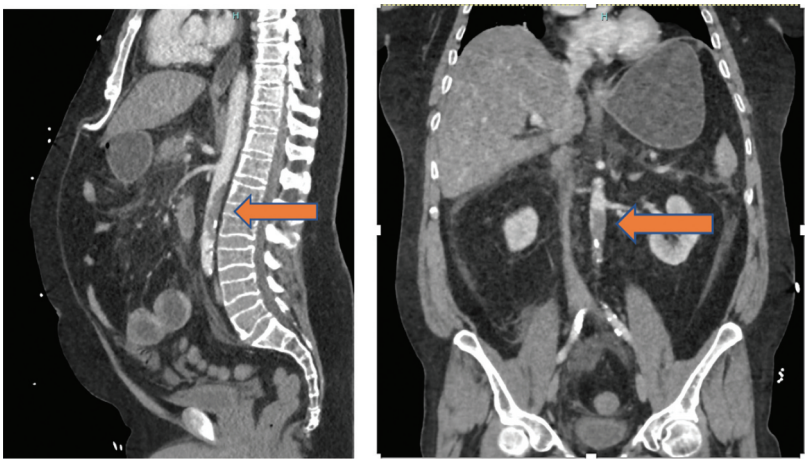
Introduction: A 57 year old male patient presented to the emergency department with shock, abdominal pain and acute ischaemia of the lower limbs.

Case description: A 57 year old male patient with no relevant previous medical history presented to the emergency department with abdominal pain, backache and vomiting. On clinical examination, he was profoundly shocked; vital signs were: a heart rate of 135 bpm, a blood pressure of 65/40 mmHg, capillary refill time of 6 seconds, a respiratory rate of 26 with oxygen saturation of 95% on room air. Patient was afebrile and drowsy. The abdomen was diffuse tender with absent pulsations on the right femoral artery and weak pulsations on the left femoral artery. Arterial blood gas showed a pH of 7.11, bicarbonate of 14 mmHg, a base excess of – 14 with a lactate of 12 mmol/L. Po2 was 74 mmHg on room air with a PCo2 of 40 mmHg. Blood examination showed a leukocytosis of 25.000 with left shift, c reactive protein of 190 mg/L, lipase was 5810 U/L and serum creatinine was 4.2 mg/dL. Resuscitation with intravenous fluids was started and an urgent CT scan of the thorax and abdomen was performed. This showed an acute pancreatitis with a subocclusion of the infrarenal abdominal aorta due to an aortic thrombosis (fig 1). The patient was transferred to intensive care with ongoing resuscitation. 3 hours after initial presentation he started complaining of pain in both lower legs and clinical examination revealed bilateral absent pulsations in both femoral arteries with a paresis of both lower legs. The diagnosis of Leriche syndrome was made; intravenous heparine was started and an urgent aortic trombectomy was done. Despite this surgical intervention persistent ischaemia of the lower limbs continued to exist and patient developed therapy resistant multiple organ failure. 20 hours after initial presentation the patient passed away.

Discussion: Vascular complications of acute pancreatitis have been most commonly associated with alcohol-induced, necrotizing, and chronic pancreatitis. These complications typically include hemorrhages, formation of pseudoaneurysms, and splenic vein thrombosis. Thrombosis of the splanchnic venous system occurs in approximately 2% of patients with pancreatitis, but thrombosis is rarely seen in the arterial system; this usually develops after the rupture of an atheromatous plaque. In the setting of acute pancreatitis, there are multiple microcirculatory changes that tilt the hemostatic balance towards clot formation. Elevated levels of fibrinogen and D-dimer have been found in patients with pancreatitis. The release of proteolytic and lipolytic enzymes into the bloodstream causes disruption of the vessel wall and activates coagulation factors and platelets. Moreover, local inflammation, pressure necrosis, mass effect, and hypovolemia together induce vascular stasis and vasospasm, creating a prothrombotic environment. Leriche Syndrome, also commonly referred to as aortoiliac occlusive disease, is a product of atherosclerosis affecting the distal abdominal aorta, iliac arteries, and femoropopliteal vessels. Patients with peripheral arterial disease may be asymptomatic (10%), so the exact prevalence and incidence of Leriche Syndrome are unknown. The classical triad of the Leriche Syndrome is claudicatio, impotence, and absence of femoral pulses. While impotence and sexual dysfunction may occur in the majority of patients, the hallmark of Leriche Syndrome is reduced or absent femoral pulses. However, due to collateral

vasculature, limb-threatening ischemia is not universal. Surgical treatment options for Leriche Syndrome include thromboendarterectomy, aortobifemoral bypass and percutaneous transluminal angioplasty with or without stenting. Without treatment, the prognosis of Leriche Syndrome is poor. However, with modern medicine outcomes are good. In some cases with slow progression, collaterals may develop as a self-compensating mechanism. Our patient presented with therapy resistent shock and multiple organ failure; hence, the outcome was not determined by the surgical intervention as such. In our patient, the inflammatory and protrombotic state associated with the acute pancreatitis presumably triggered the trombosis formation in the infrarenal aorta. 6 weeks prior to presentation patient underwent a CT scan of the abdomen after a colonoscopy which showed two submucosal nodules. This CT scan demonstrated already significant atherosclerosis of the infrarenal aorta but without a thrombosis; the pancreas was also normal. The previous medical history of this patient was unremarkable and as cardiovascular risk factors smoking and moderate obesity was noted. Routine use of an abdominal CT scan in patients with acute pancreatitis is unwarranted, as the diagnosis is apparent in many patients and most have a mild, uncomplicated course. However, in a patient failing to improve after 48–72 hours (e.g. persistent pain, fever, unable to begin oral feeding, . . .), imaging is recommended to assess local complications such as pancreatic necrosis. Computed tomography and MRI are comparable in the early assessment of acute pancreatitis. In this case, an early CT scan was performed because of the clinical picture consisting of shock and absent pulsations in the right femoral artery, not primarily for the imaging of the pancreas.

Conclusion: Arterial thrombosis due to pancreatitis is a very rare event. In this case report, we've presented a Leriche syndrome due to a pancreatitis triggered aortic infrarenal thrombosis, leading to acute bilateral, lower limb, ischaemia, shock and multiple organ failure. Treatment consists of urgent revascularization.



Images : CT scan abdomen demonstrating aortic thrombosis

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11. An overpressurisation incident in a multiplace hyperbaric chamber, a rare but potentially dangerous complication with multidisciplinary consequences.

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Introduction: Hyperbaric oxygen therapy (HBOT) is an established therapy for various pathologies such as decompression illness, air embolus, CO intoxication, acute hearing loss and others. As with every therapy-specific risks are associated with HBOT. These are related to pressure changes and altered partial pressures of O2, CO2 and N2 and are governed by the gas laws. Barotrauma and decompression illness (DCI) are important complications of which DCI is the most notorious one. It results from gas bubble formation in blood and tissues upon a rapid decompression. This is the first report of an incident in a multiplace hyperbaric chamber (HC) with an uncontrollable overpressurisation followed by a rapid decompresson during a routine hyperbaric session for acute hearing loss.

Case: On october 2nd, 2020 six patients were scheduled for a routine HBOT session: 15 min dive to 2.5 bar, 70 min at 2.5 bar and a 10 min ascent to 1 bar. None of the patients had absolute or relative contraindications for HBOT and all of them consented with the ruling safety prescriptions at our institution. Compression phase evolved as planned and none of the patients had any trouble in clearing. However after 10 min at plateau pressure (2.5 bar) a sudden rise in pressure took place accompanied by a loud noise. The operator immediately started manual decompression at the console by moving the handlebar in the opposite direction, which was uneffective. He then activated the emergency stop which did not result in any reduction in pressure, moreover pressure kept on rising. Even manually switching the emergency reduction valve into the fully open position did not have any effect. Immediately after this action the HC pressure reached the maximum value of 4 bar, opening the final safety valve end resulting in a rapid decompression which was completed in only 5 min. This rapid decompression was accompanied by an enormous noise, caused by the flow of large amounts of air, and making any communication with the already anxious patients inside the chamber impossible. As also dataregistration failed a reproduced pressure profile of the incident is shown in Figure 1. Moreover during the process, the fire extinction system was accidentally activated by a colleage nurse who was called in for help, and thus releasing 500 L of water into the HC. This added to the patients anxiety and panic. By the time the door of the HC could be opened, room was made available in the emergency department (ED) to receive the patients. An hyperbaric physician, pneumology- and ENT-specialist were already on site to examine every individual patient. The first two mentioned specialists also have a certificate in Diving Medicine. None of the patients experienced dyspnea, chest pain, coughing or cutaneous symptoms. No pulmonary barotrauma was suspected nor detected. The ENT findings of the patients are summarized in Table 1. Barotrauma of the middle ear was present in 4 patients, only one had a perforated ear drum. Of the two patients without middle ear barotrauma (MEBT) one was a previous scuba diver and had been able to clear during the rapid compression phase, the other patient had bilateral diabolo's. MEBT was treated by nasal decongestants an analgesics. One patient reported a light headache upon arrival at the ED, which disappeared over the following hours. A second patient developed pain at his left elbow ca 30 minutes after he left the HC. However, this patient refused any further investigation and left the hospital on his own risk and responsibility. Contact by phone 24 hrs later revealed that the joint pain at his left elbow had disappeared, but he now complained of pain in both legs. He again refused any further medical investigation. All patients received normobaric oxygen by facemask (FiO2 1.0) and close observation at the ED during 4 h. Normobaric oxygen is the first-line treatment in decompression illness and was started as soon as the patients got out of the HC. No new symptoms were reported during the observation period, and vital parameters remained normal and stable. Patients were subsequently reassured and discharged home. They were instructed to contact the ED in case they had any discomfort, new symptoms or anxiety. On days 2 and 5, they were contacted by phone to assess physical and emotional wellbeing. All patients reported good recovery without any new events or symptoms.

Discussion: Technical failure of an HC is a rare phenomenon, and pressure dysregulation has to our knowledge not been reported before. This case describes an uncontrollable rapid compression followed by rapid decompression, circumstances prone to the development of barotrauma and decompression illness. No life-threatening or debilitating complications developed, only rather minor barotrauma of the middle ear was experienced by 4 out of 6 patients. Two patients experienced symptoms possibly compatible with decompression illness. One of them refused any medical investigation. Through technical inspections by the hospital technical service, the HC company and independent experts revealed corrosion of the profile controller reduction valve. This was most likely due to a too high humidity of the technical compressed air produced on site. Indeed, monitoring of the quality of this air was deficient. An independent expert evaluated the incident and concluded it was not foreseeable and operators handled in a logic and decided manner.

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Practice for Hyperbaric Oxygen Therapy. [3] Pollock NW, Buteau D. 2017. Updates in Decompression Illness. Emerg Med Clin North Am 35(2): 301–319.

Table 1. ENT findings in six patients after exposure to a rapid compression-decompression incident during HBOT for acute hearing loss.

Sex & age		Normal	Hyperemic	Blue ear drum	Perforation
1	F – 63		Bilat		
2	M – 48	bilat			
3	M – 60			bilat	
4	M – 77			left	Left
5	M – 35			bilat	
6	M – 49	Diabolo's			

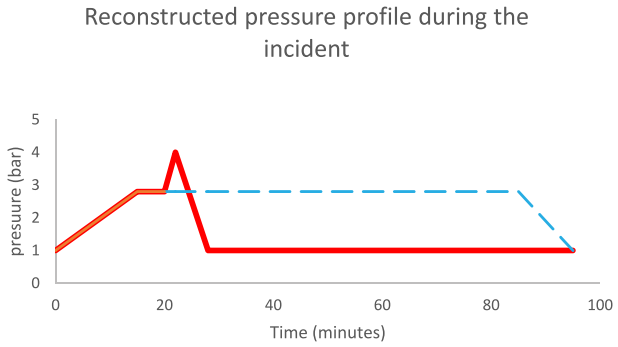

Figure 1. Reconstructed pressure profile of the compression/decompression incident. Dotted line represents the normal pressure course of an uncomplicated HBOT session.

12. Serious methanol intoxication by inhalation: a case report

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Introduction: Methanol or methyl alcohol (CH3OH) is a colorless, flammable liquid belonging to the chemical class of the alcohols. Methanol intoxication is an uncommon but potentially serious poisoning after intentional or accidental ingestion. While accidental inhalation of methanol has been described, this mostly causes milder forms of clinical symptoms and rarely has more serious consequences.

Case report: A 40-year-old male was transferred from a primary hospital to our tertiary non-university teaching hospital because of an unexplained metabolic acidosis. At admission to the primary hospital emergency department, he was intubated due to somnolence. His last words before induction were 'I've made a capital error'. A brain CT scan after intubation showed hypodense zones lateral in the lentiform nucleus bilaterally and a punctiform hyperdensity in that zone on the right side suggesting a very small bleeding. Toxicology screening on urine was positive for amphetamines. Ethanol level was below detection limits. A few hours after intubation, the patient was transferred to our hospital. To differentiate between the high anion gap acidosis, an osmolal gap was calculated, and was found to be significantly elevated to a value of 51.5 mOsm/kg. A tentative diagnosis of a toxic alcohol intoxication was made. Fomepizole therapy was started. The diagnosis was later confirmed by the presence of methanol on mass spectrometry. The patient made an uneventful recovery and left the intensive care unit two days later in good overall condition, without neurologic sequelae or sight loss. In the meantime, the police services conducted a house search and found a homemade drug laboratory. The patient was making drugs but got intoxicated by the released vapors.

Discussion: Toxic alcohol intoxication is an important consideration in a patient with an unexplained high anion gap metabolic acidosis. Next to its various industrial uses, methanol is a key ingredient to produce various synthetic drugs including amphetamines and ecstasy. Inhalation of methanol is rare but can follow this illegal drug production. The 'laboratories' tend to be inside residential houses with sealed windows and doors to prevent being caught. Consequently, these are poorly ventilated spaces that increase the risk of inhalation of toxic fumes by the producer. Furthermore, the patient will mostly withhold information as to the origin of their symptoms. It is thus imperative to calculate an osmolar gap in patients with unexplained high anion gap metabolic acidosis. As the toxicity of methanol is largely caused by hepatic metabolization into toxic metabolites (formaldehyde and formic acid), treatment primarily consists of the prevention of the formation of these compounds by inhibiting alcohol dehydrogenase. This can be achieved by administering either fomepizole or ethanol. Furthermore, hemodialysis should be considered as methanol and formate can be dialyzed. The biggest advantage is thus a decreased length of stay, because of faster elimination of methanol and its metabolites. Our patient did not receive dialysis and had a good outcome.

Conclusion: Methanol intoxication by inhalation is very rare and mostly presents with milder symptoms. However, as this case shows, emergency physicians should be aware of the possibility of serious inhalation toxicity by this chemical compound.

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13. Evaluation of teaching programs among Belgian emergency medicine residents, a national survey

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Introduction: There has been a growing awareness of the shortcomings of traditional style of synchronous teaching in emergency medicine (EM). This predominantly because it does not connect with the dynamic, team-based working mechanism in the emergency department and hinders residents in the attendance of teaching moments. Furthermore, residents who are able to attend may be fatigued and stressed and have difficulty focusing on the content, which may lead to suboptimal information retention. This is in contrast to an asynchronous teaching style which is an individualized learning method away from groups of, which allow learners to consume material at their own pace according to their own timetable. The primary purpose of this study was to evaluate the current teaching methods used in the training of EM physicians. How do the EM residents evaluate the different modalities? What is their ideal training program and what is the gap between the training they are getting and the training they think would be ideal? This with the aim of improving the quality of education, based on the input of the trainees as well as the scientific literature.

Methods: After approval of the institutional review board at the University of Leuven, a survey was created. An anonymous survey link was distributed to EM residents at all levels of training, at the 4 EM programs of Flanders (namely UZ Leuven n = 65, UZ Antwerpen n = 53, UZ Gent n = 50, VUB Brussel n = 41). The total amount of EM resident that where eligible for inclusion where 209. Recruitment was followed up by a modified Dilmann method, in which reminders were sent a maximum of 3 times.

Results: Of the 209 residents eligible to participation 95 residents (45.5%) completed the survey. Residents receive teaching mostly synchronous (76.3%) and most often in the classic ex cathedra style (44.8%) followed by interactive lessons (31.8%). In general, flipped classroom modalities and online curricula are not well integrated in Belgian teaching programs. The residents received more teaching hours per month in university hospitals in comparison with non-university hospitals (21.0 vs 13.8 h/month, $p < 0.001$). In particular, more time was spent on simulation-based medical education ($p < 0.001$) and case-based lectures ($p = 0.02$). Residents use online educational material more often at home than at the working site (51.4% vs 6.23–11.4%). Podcasts are especially popular self-education tools (19.1%). Residents scored bedside teaching and simulation-based medical education (SBME) as the most valuable teaching modalities (mean 5.7/6 on a scale question). They had a preference to active (91.2%) and synchronous (70.3%) learning. They chose groupwork/interactive sessions above individual learning (71.4%) and preferred the conference room to online education (84.6%). They chose interleaved or spaced learning above blocked (74.7%). Learners would incorporate more bedside teaching, simulation-based medical education, specific courses (trauma course/ ALS course)/congresses and podcasts (all $p < 0.001$). They would spent less time in classic conference room lectures, wiki's and journal clubs (all $p < 0.001$).

Discussion: A shift to more online asynchronous teaching methods can be of theoretical advantage. Especially in resident programs as is in Belgian where residents spent half of their residency practicing in other disciplines and many years in non-university hospitals where teaching is hospital or even discipline dependent. Within this asynchronous part of a training program FOAM can be easily incorporated. Prereview by faculty staff members could be a good method due to the elaborate number of available sources. Feedback mechanisms and credit systems to guarantee and follow-up training could be of benefit. Although these methods scored low in our survey, this could be through unfamiliarity or nonstructural set up. In US and Canada, these modalities received high scores. Follow-up by flipped classroom where high-level teaching can be given incorporating active learning methods such as team or problem-based learning. Active learning methods were scored highly by residents in multiple studies. An interleaved teaching program can further enhance information retention. Some skills are better trained hands on. Bedside teaching and simulation-based education was deemed by residents to be highly valuable. Multiple studies confirmed these positive effects. Multimodal teaching seems the way to go, it closely resembles our daily working life and has scientific base. Due to demanding work hours teaching is not always guaranteed. A fixed amount of teaching hours a week facilitated by time-off for residents seems beneficial to enlarge attendance in the synchronous part or the program.

14. Alcohol intoxication in the emergency department: gender differences in context, symptoms and outcome.

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Introduction: Alcohol abuse is a major health concern. In the literature, an important difference between sexes has been described. In Belgium, epidemiological studies show that the frequency and quantity of drinking is both higher in men. In the European Region, the prevalence of alcohol use disorder among men is 14.8%, whereas for women it is only 3.5%. Furthermore, alcohol-related death and disability is seen way more often amongst men. There is a lot of information about contextual and social factors leading to alcohol abuse, but no clear data can be found about the reasons for admission and contextual factors of alcohol abuse in the subgroup that presents to an emergency department (ED).

Aims: In this ED-based study, we want to evaluate whether or not the figures described above are accurate for the Ghent area. Furthermore, we want to determine which social and contextual factors differ between men and women presenting to an ED with acute alcohol intoxication

Methods: For the period 01/09/2013 – 31/08/2014, all patients with a blood alcohol concentration (BAC) of at least 0.5 g/L were identified from the laboratory databases of 5 hospitals in Belgium. Data were collected retrospectively from the patient chart.

Results: Of the 3 918 included patients, only 1 255 (32.0%) were female. The male/female ratio in the different age categories ranged from 1.49 to 2.73. The median BAC was 2.19 g/L in females and 2.35 g/L in males. The reason for admission was mostly due to psychological/psychiatric problems in women and to traumatic lesions in men. The context of alcohol intake was most frequently chronic abuse (women 35.3% and men 44.8%). Co-ingestion of illicit drugs or medication was found in, respectively, 3.7% and 14.4% of women (versus 6.5% and 6.7% of men).

Discussion: If we review the literature, we conclude that there are clear and large gender differences throughout Europe related to alcohol abuse, with a typical male/female ratio of 2–3, which is consistent with our data.

Conclusions: Acute alcohol intoxication is more frequent among men than among women. Gender-specific differences seem to be limited to the reason for admission and the co-ingestion of illicit drugs and medication.

15. Automated external defibrillators in school?

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Introduction: Automated external defibrillators (AEDs) placed in public locations can save lives of cardiac arrest victims. In this paper, we try to estimate the cost-effectiveness of AED placement in Belgian schools. This would allow school policymakers to make an evidence-based decision about an on-site AED project.

Methods: We developed a simple mathematical model containing literature data on the incidence of cardiac arrest with a shockable rhythm, the feasibility and effectiveness of defibrillation by on-site AEDs and the survival benefit. This was coupled to a rough estimation of the minimal costs to initiate an AED project.

Results: According to the model described above, AED projects in all Belgian schools may save 5 patients annually. A rough estimate of the minimal costs to initiate an AED project is 660 EUR per year. As there are about 6000 schools in Belgium, a national AED project in all schools would imply an annual cost of at least3960000EUR, resulting in 5 lives saved.

Conclusions: As our literature survey shows that AED use in schools is feasible and effective, the placement of these devices in all Belgian schools is undoubtedly to be considered. The major counter-arguments are the very low incidence and the high costs to set up a school-based AED programme. Our review may fuel the discussion about whether or not school-based AED projects represent good value for money and should be preferred above other health-care interventions.

16. Leucocytoclastic vasculitis as an adverse cutaneous reaction following COVID-19 vaccination.

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The patient is a 55-year-old Caucasian male with a medical history of hypertension and chronic myeloid leukemia. Ten months before admission, he was infected with the COVID-19 virus. His daily therapy included antihypertensive medication (amlodipine and bisoprolol) and dasatinib, all taken without dose changes for the last year. He presented at the emergency department with a pruritic rash, six days following second dose of COVID-19 vaccine (ChAdOx1 nCoV-19 corona virus vaccine). Rash occurred already on the same day of vaccination but became progressively worse, spreading from the back to the gluteal region and lower limbs. The patient also reported

constitutional symptoms such as general malaise, anorexia, and fever. Other than his vaccine, the patient had not taken any new medications, new supplements, or foods prior to the development of the skin rash. After his first vaccination, he also noticed a minor erythematous rash over the lower limbs for which he did not seek any medical attention, and which resolved spontaneously over a couple of days. Upon medical examination, the patient had stable vital parameters except for a fever (39°C). Widespread erythematous and edematous plaques were seen on the back and the inguinal region of this patient, with additionally palpable purpuric papules over the lower limb (Figures 1–4). Further clinical examination revealed no other abnormalities.

Leukocytosis (white blood cells 16,980/mm3) and highly elevated C-reactive protein (325 mg/dl) were found in peripheral blood tests. Chest X-ray and abdominal ultrasound showed normal findings. Urine test and blood cultures remained negative. Patient was admitted and skin biopsy was performed. On histopathological examination, epidermal, dermal, and perivascular inflammatory infiltrates of neutrophils and lymphocytes were observed, suggestive for early stage leucocytoclastic vasculitis. Patient was treated with oral prednisone 0.5 mg/k/day, tapered over two weeks with complete resolution of all symptoms.

Since the administration of COVID-19 vaccines, several adverse cutaneous reactions were described. These reactions occurred as well immediately as delayed, with a wide variety in severity, from a local rash, known as 'COVID-arm', to more severe conditions as Stevens-Johnson syndrome. [1, 2] Most of the cases reported were observed after administration of mRNA-based COVID-19 vaccines. Leucocytoclastic vasculitis is a small vessel vasculitis with an incidence rate of 30 cases per million people per year. There is an association with auto-immune disease, certain medications, underlying infection, and malignancy [2], as described in our patient. Vasculitis has been reported following administration of both pneumococcal and influenza vaccine [5, 6]

Here, we have presented a case of leucocytoclastic vasculitis following second ChAdOx1 nCoV-19 vaccine. There was also a more limited rash after first-dose administration, but without constitutional symptoms, suggesting more severe reaction to re-exposure as was described earlier [2] To date, only two similar cases were reported [5]. Our patient also recovered well after his treatment with corticosteroids.

It is important to acknowledge that cutaneous adverse events may occur following vaccination, but most of these reactions are mild and can be relatively easily managed. Except for some rare absolute contraindications to second-dose vaccination (e.g. one case of Stevens-Johnson syndrome [2]s), there is no evidence for delaying the vaccine program. It is obvious that patients who had cutaneous adverse events following first vaccination should be observed more closely. In these times of ongoing COVID-19 pandemic and active vaccination programs, emergency physicians should be aware of the possibility of vaccine-related cutaneous side effects, and how to recognize and manage them efficiently.

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17. Undressing the DRESS syndrome: Drug reaction with eosinophilia and systemic symptoms in the emergency department

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Introduction: A drug reaction with eosinophilia and systemic symptoms (DRESS) syndrome is a potential life threatening, medication-induced hypersensitivity reaction [1]. Allopurinol and antiepileptic medications, such as carbamazepine and phenytoin, are thought to be the predominant cause of the syndrome, with an incidence ranging from 1 in 1,000 to 1 in 10,000 of drug exposures [2]. Onset of symptoms is often delayed 2 to 8 weeks after drug initiation and include fever, cutaneous manifestations such as a maculopapular or urticarial eruption, lymphadenopathy, hematological findings (eosinophilia, leukocytosis, atypical lymphocytes) and visceral involvement (hepatitis, myocarditis, nephritis, pneumonitis, encephalopathy) [3]. Mortality is up to 10%, most often due to liver toxicity and failure [4]. This abstract describes a case of suspected Allopurinol – induced DRESS syndrome, at the emergency department of AZ Sint-Lucas Ghent, Belgium, in December 2019.

Case report: A 77-year-old woman, with a history of hypertension, presents at the emergency department, having a rash that started 2 days prior, general weakness and falling. She had a fever of 39.1°C, a distinct urticarial eruption on the trunk, and a purpura like image on the lower limbs. Further clinical examination was normal. Laboratory findings showed a high inflammatory profile, elevated serum creatinine, troponins and creatine kinase, normal liver enzymes, and normal white blood cell count without eosinophilia or leukocytosis. Urine sample, electrocardiogram and chest radiography appeared normal. The patient was admitted to the nephrology department with a differential diagnosis of DRESS syndrome complicated by acute renal failure, mild myocarditis and myositis. There were no significant anomalies on echocardiography. CT imaging of thorax and abdomen merely withheld bilateral axillary lymphadenopathy. Skin biopsy showed perivascular dermatitis with eosinophilia, possibly indicating a toxic–drug reaction. The suspected culprit drug was Allopurinol, though the patient took this medicine already a few months. The patient fully recovered with prompt withdrawal of the causative drug, supportive treatment, and a tapered systemic and local corticosteroid therapy.

Discussion: This case report highlights the importance of recognizing potentially dangerous dermatologic conditions in the emergency department. A recent introduction of a drug, followed by a cutaneous eruption, fever, eosinophilia and/or multiple organ dysfunction should raise suspicion of DRESS syndrome. Early cessation of the culprit drug and corticosteroid therapy are recommended in the management of the syndrome [1–4].

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18. Case report: euglycemic ketoacidosis in a pregnant woman with Covid-19

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Introduction: Covid-19 is known to be associated with ketoacidosis, although data about pregnancy-related euglycemic ketoacidosis with concomitant Covid-19 is rare.

Clinical presentation: A 41-year-old woman G4P3M3 presented at the emergency department at 30 weeks gestation with a 6-day history of shortness of breath and anorexia. She had no significant medical background and no personal history of diabetes. On admission she was unwell, tachycardic en tachypnoeic with a respiratory rate of 35 bpm and a saturation of 94% on 2 L via non-rebreather oxygenmask. Initial arterial blood gas illustrated a raised anion gap metabolic acidosis: pH 7.28, pCO2 16.9 mmHg, HCO3 8.1 mmol/l, base excess 17.4 mmol/l, lactate 0.8 mmol/l, glucose 150 mg/dl. Urinary ketones measured 4 + . CRP was 45 mg/l and Covid-PCR was positive. Urinary infection was excluded. Mild proteinuria in combination with the absence of elevation of her blood pressure compared with outpatient values could not justify the diagnosis of preeclampsia. Gestational diabetes was excluded through non-fasting Oral Glucose Tolerance Test. Fetal movement and fetal heart rate were normal. She was diagnosed with euglycemic ketoacidosis and received fluid resuscitation with electrolyte replacement in combination with intravenous 10% dextrose and insulin infusion. After 3 days, the patient could leave the ICU.

Literature key-points: Euglycemic ketoacidosis is characterised by increased anion gap metabolic acidosis, ketosis and normoglycemia. Covid-19 infection disrupts metabolic control through reduced insulin production, whereas pregnancy increases insulin resistance, enhances lipolysis and increases ketogenesis. Starvation stimulates breakdown of fatty acids which also leads to ketosis. The primary goals of treatment are fluid resuscitation, insulin administration with consideration of dextrose addition and electrolyte correction. Treatment should be guided through repeated blood gas analyses with keeping in mind the normal physiologic changes in pregnancy. Nitroprusside-testing for ketones detects acetate and acetoacetate but not the predominant β-hydroxybutyrate. Therefore, it is possible for the testing to be negative although the patient has elevated ketones. During treatment, it is not useful to measure ketones since they will raise initially because of conversion of β-hydroxybutyrate to acetoacetate. As such, it is recommended to test ketones only at presentation.

Conclusion: Pregnant women with shortness of breath should always raise suspicion for ketoacidosis, even when they turn out to be Covid-positive, euglycemic and ketones on urine-analysis are normal.

19. Investigating a new triage method in the emergency department: Impact of a triage liaison provider on the length of stay of fast-track patients.

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Objectives: Overcrowding and long waiting time are worldwide recurrent issues in emergency departments. Many suggestions have been studied to solve this problem, such as implementation of a fast-track area within the ED for minor injuries or the use of a nurse to request basic examinations. In this study, we tested an additional mean: the triage liaison provider (TLP), who sees patients after the triage nurse. We evaluate the impact of the implementation of a TLP on the patients' length of stay (LOS), in a neutral financial resource model.

Methods: This is a prospective controlled single-center study performed in a general academic tertiary care hospital ED. During a control period and a testing period of both two weeks, 1348 patients consulting in the fast-track area were included. The primary outcome was to compare the patient's LOS between both periods.

Results: Overall median LOS was reduced by 11 minutes during TLP period; 129 minutes (min 2 – max 502) vs 140 minutes (min 10–max 570) for the control period (p = 0.004). The reduction of LOS was higher for patients without complementary examinations (19 minutes) and during the weekends (21 minutes).

Conclusion: Without any additive medical resources and without any particular traineeship, the implementation of a TLP was associated with a decrease in LOS in the ED. Although the reduction was modest, we identified some population and specific shift periods that benefit from TLP implementation.

20. Delayed presentation of acute stroke patients in a Belgian stroke center during the first COVID-19 wave

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Introduction: During the first COVID-19 outbreak people tended to avoid hospitals due to fear of contamination. Some large population-based studies already suggested that this resulted in collateral damage of patients with other acute diseases, such as acute stroke. Our primary goal was to determine whether the first COVID-19 wave affected the onset-to-door time (OTDT) and consequently, the therapeutic time window for thrombolysis (? 4.5 hours after onset), door-to-CT time (DTCT) and the time to treatment (measured as door-to-needle time (DTNT) for intravenous thrombolysis (IVT) and/or door-to-groin time (DTGT) for endovascular thrombectomy (EVT)) of stroke patients at the emergency department of the Ghent University Hospital, Belgium (UZG). Secondly, the complication rate (need for intensive care, mortality after 7 days) and functional outcome after 90 days were investigated for these patients in order to observe if a possible delay in presentation and/or treatment had a negative effect on the outcome.

Methods: This retrospective observational study included all patients admitted to the UZG, with a transient ischemic attack or acute stroke between March 1st, 2020 and May 31st, 2020 (COVID-19 period) and compared these with patients admitted in the same months in the year before (2019, pre-COVID-19 period). International Classification of Diseases-Tenth Revision Codes (ICD codes) were used to select patients, based on the discharge diagnosis. Data were gathered retrospectively by consulting the patient records and IBM SPSS version 28.0 was utilized for statistical analysis. Comparison of relevant patient characteristics, such as the National Institutes of Health Stroke Scale (NIHSS), was made to evaluate homogeneity between both cohorts. Modified Rankin Scale (mRs) was used to express the functional outcome after 90 days. Continuous variables were compared with Mann-Whitney U-test if nonparametric and Student's T-test for parametric variables. Between-group comparisons for categorical data were made using Chi-square or Fischer's exact. P value of <0.05 was considered statistically significant.

Results: The COVID-period consists of 87 patients, the pre-COVID period of 89 patients. NIHSS (mild 0–7; moderate 8–14, severe >14) was comparable between both groups. The OTDT was longer in patients admitted during the COVID-period (median 360 min. [240;600] vs 125 min [89;216], p = 0,017), with a significantly lower proportion of patients within the therapeutic window of IVT (35.4 vs 64.6%, p = 0,016). A prolonged OTDT of >4,5 hours was mainly observed in the month April (April 2020: 60.0% vs April 2019:23.3%, p = 0.004) and in patients with mild strokes (NIHSS 0–7, 63.3 vs 34.4 %, p = 0.004). Both periods showed no significant difference in terms of DTCT (p = 0.700), DTNT (p = 0.252) and DTGT (p = 0.201). There was no difference in mortality rate after 7 days (p = 0.551), need for intensive care (p = 0.162) and functional outcome after 90 days (p = 0.117).

Discussion: We observed an increase in the OTDT in stroke-patients during the first wave of the COVID-19 pandemic, with fewer patients presenting within the therapeutic time window for IVT. However, once arrived in the hospital, patients were diagnosed and treated in a comparable time interval: the time to CT and hyperacute treatments such as IVT and EVT were similar in both periods. Moreover, there was no increase in mortality rate after 7 days or adverse functional outcomes after 90 days. Nevertheless, further investigation is needed on the long-term outcome of these stroke patients. In conclusion, this pandemic had no impact on the overall in-hospital stroke care.

21. Spinal immobilization without rigid cervical collar does not cause neurological deterioration in patients with blunt cervical spine injury: a retrospective analysis of 36 patients.

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Introduction: The use of a rigid cervical collar in immobilization protocols in trauma patients has been associated with complications without proven benefit of mechanical stabilization or prevention of secondary injury to the cervical spine. Antwerp University Hospital therefore omitted the use of the rigid cervical collar in its spinal immobilization protocol in accordance with international guidelines. Patients are immobilized on a scoop stretcher with head blocks prehospital and on a padded trauma board with head blocks in the emergency department (ED). If a rigid cervical collar was applied prehospital, it is removed at patient transfer in the ED. We investigated whether omitting the rigid cervical collar was associated with neurological deterioration in patients with cervical spine injury.

Methods: We included all major trauma patients diagnosed with blunt cervical spine injury (defined by the Abbreviated Injury Score-AIS) who presented at the ED of Antwerp University Hospital in 2018. Two subgroups were created: patients who presented with and without rigid cervical collar. We evaluated prehospital and on arrival in the ED whether patients had focal neurological deficit (FND) attributable to spinal injury, were neurologically intact or had neurologic deficit attributable to other injuries (NI/OI) or were not assessable because of a Glasgow Coma Scale (GCS) <9, agitation or sedation (NA). In the group who presented with a rigid cervical collar, neurological evaluation was performed after its removal at arrival.

Results: Thirty-six patients were identified with cervical spine injury. Median age was 44 (32–75) years, median ISS was 29 (22–42), 11 (31%) had severe cervical spine injury (AISSPINE ≥ 3), 18 (50%) had associated traumatic brain injury (TBI) and the median GCS was 14 (5–15) prehospital and 12 (3–14) in the ED. A rigid cervical collar was applied prehospital in 10 patients. Prehospital, one patient had FND, four had NI/OI and five were NA. In the ED, evaluation without collar showed 2 additional patients with FND. One deteriorated from NI/OI to FND with paresthesia of the left arm and leg and decreased motor response of the right hand but was treated conservatively without collar or surgery. A second patient was NA prehospital but had paresis of the left leg attributable to a lumbar spine injury in the ED. No collar was applied in 26 patients. Prehospital, six patients had FND, 15 had NI/OI and 5 were NA. In the ED, no additional patients had FND, 11 were NA (all due to reduced GCS or respiratory insufficiency) and 9 had NI/IO. There were no statistically significant differences between the groups with and without rigid cervical collar regarding demographics, GCS prehospital and in the ED, injury severity and the incidence of TBI.

Discussion and conclusions: Our data suggest that removing the rigid cervical collar in patients with cervical spine injury was not associated with neurological deterioration. One patient had a decreased motor response after removal of the collar but was treated without further immobilization, hence the collar would have been removed in any case. Prehospital transfer without rigid cervical collar was also not associated with neurological deterioration. As TBI was present in 50% of the patients, a rigid cervical collar may have caused harm by increasing intracranial pressure. Further investigation of a larger sample size is needed to confirm these preliminary results.

22. Retrobulbar injury associated with major trauma: a 4-year retrospective analysis from a major trauma population in a level 1 trauma centre

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Introduction: Retrobulbar injury (RBI) can cause orbital compartment syndrome (OCS). In patients with craniomaxillofacial injury, the incidence of OCS is estimated around 1%. OCS is a clinical diagnosis and is treated by emergency lateral canthotomy and cantholysis (LCC). Delayed treatment of OCS may cause permanent loss of vision. As trauma teams focus on life-threatening injuries, OCS can be missed easily. The current analysis describes the incidence, clinical signs and risk factors for RBI and defines the subgroup in which LCC is indicated.

Method: We selected all major trauma patients who presented at Antwerp University Hospital from 2017 to 2020 with traumatic brain injury (TBI) and/or face injury (defined by the Abbreviated Injury Score (AIS)). Radiology reports were reviewed for RBI. Patient's age, gender, Injury Severity Score (ISS), mechanism of injury, severe head or face injury (AISHEAD or FACE ? 3), Glasgow Coma Scale (GCS), use of anticoagulants, presence of proptosis or tight eyelids, type of orbital fracture, type of RBI (extraconal haemorrhage, retrobulbar haemorrhage or other injury such as air or bone fragments), intra-ocular pressure (IOP), presence of OCS and treatment choice were documented. Mortality, discharge destination, Glasgow Outcome Scale (GOS) and vison acuity were recorded. Information on the presence of Relative Afferent Pupillary Defect (RAPD) was lacking in most cases, so we did not include this in the analysis. We compared characteristics of the patients with and without RBI. For the patients with RBI, we compared patients treated conservatively with those treated with emergency LCC.

Results: We documented 616 major trauma patients with TBI and/or facial injury. One hundred and fifty patients had an orbital fracture, 92 patients (15%) had a RBI of which 12 had a retrobulbar haematoma, 21 an extraconal haematoma and 59 other injuries (i.e. air or bone fragments). OCS was diagnosed in 15 patients (2.4%). RBI was associated with a higher ISS (30 vs. 25, $P < 0.001$), a lower GCS (7 vs. 10, $P < 0.001$), multiple orbital wall fractures ($P < 0.001$), presence of proptosis (95% vs. 45%, $P < 0.001$), severe head injury (18% vs. 11%, $P = 0.012$) and severe facial injury (52% vs. 12%, $P < 0.001$). There was no significant association between RBI and gender, age, anticoagulant use, mechanism of injury, presence of tight eyelids or outcome. LCC was performed in all patients diagnosed with OCS. When compared to the conservative treatment group, LCC was associated with a higher IOP (36.7 mmHg vs. 18.5 mmHg, $P < 0.001$), anticoagulant use (63% vs. 11%, $P < 0.001$), presence of proptosis (40% vs. 0%, $P < 0.001$) and presence of tight eyelids (33% vs. 5%, $P = 0.027$). If both proptosis and tight eyelids were present, LCC was performed in 75% of the cases. The likelihood of performing a LCC was higher with a retrobulbar haematoma or an extraconal haematoma than when only retrobulbar air or bone fragments (33% vs. 29% vs 8%, $P = 0.016$). There was no difference in outcome, ISS, GCS, associated orbital wall fracture or type of anticoagulation. LCC was performed by the emergency physician in 9/15 patients (60%). Vision was not consistently followed-up and was influenced by confounders like muscle entrapment, nerve transection or bulbar perforation.

Discussion: In major trauma patients, RBI was more prevalent in more severely injured patients presenting with proptosis. OCS had a higher incidence than previously described (2.4% vs. 1%), most likely due to more severe injuries in our major trauma population. We confirmed a strong correlation of proptosis and tight eye lids with OCS. Use of anticoagulants is a risk factor for OCS and the need for LCC. The absence of retrobulbar haemorrhage did not exclude the need for LCC.

23. Of emergencies and men

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Introduction: Which emergency physician has never asked himself: 'Why are patients increasingly seeking emergency services (ES) for non-emergency reasons?'. Patients who ultimately will not receive any further investigation, are a major contributor to ED overload. This study focuses on the profiles, motivations and knowledge of the Belgian health-care system of patients presenting to the EDs and who will finally only benefit from a simple consultation.

Materials and Methods: This is a single-center prospective study conducted from January 14 to 31 March 2021 at Tivoli UHC with the approval of the relevant ethics committee. The sample is composed of major patients categorized as U5 on the ICDU scale. First, demographic data were collected such as age, gender, level of education, membership or not of a mutual insurance company, and whether they had a general practitioner (GP). Questions were then asked about the reasons for their visit and about the knowledge of the Belgian health-care system, the GP on-call system and the single number 1733. For statistics, the IBM SPSS v27 program was used. Chi-square test or Fischer exact test was applied.

Discussion: One of the points highlighted in our study is the influence of the academic level on the attendance of the EDs, it is also marked when we study the prior consultation of a website, the overestimation of the degree of urgency, the idea that the EDs are more suitable for management or the hope of benefiting from complementary examinations. To limit such biased reasoning, it might be interesting to develop a website, in collaboration with the competent authorities, to orientate patients in the best possible way based on a questionnaire, as we know in the context of Covid-19 where a self-assessment test is carried out online and allows the GP to be relieved of the burden. Another finding of this study concerns the accessibility of the GP. The health landscape has changed. While most GPs work on an appointment basis, emergency rooms remain a particularly accessible place to obtain care during the day. It seems essential to increase the number of GPs; even if the number of GPs has not really decreased over time, the aging of the population and the desire of GPs to preserve their quality of life are elements that lead us to this observation. Our study also highlights a lack of awareness of the 1733 single call number and of GP on-call systems, which may be correlated with a lower level of education. To promote optimal use of available services, it would be interesting to implement a well-thought-out communication strategy targeting the population in an intersectoral manner. It might be appropriate to consider a national information campaign on the different lines of care. The improvement of primary prevention through the implementation of social marketing strategies, the creation of a prevention fund and a national program for primary lines are to be explored to improve the situation in a sustainable way.

24. Imposing care limitations in the COVID-19 critical care unit: advanced care or rather late care planning?

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Introduction: When the COVID-19 pandemic struck Belgium in early 2020, the Belgian Society of Critical Care (SIZ) proposed the use of advanced care planning and therapy limitations for individual patients in order to prevent a collapse of the Belgian healthcare system. In this retrospective study, we analyzed the care planning in COVID-19 patients that were admitted to the intensive care unit (ICU) for severe respiratory failure. We assessed the adoption level and effectiveness of the advocated advanced care planning by analyzing the presence and timing of initiation of limitation on life sustaining therapy in the individual patient.

Methods: We retrospectively analyzed all adult patients that were admitted to our ICU for COVID-19 induced respiratory failure from 14 March 2020 until 2 November 2021. The data registration included patient baseline characteristics (age, gender, BMI, frailty score, Charlson Comorbidity Scale), hospital and ICU admission date, decisions on limitations of life-sustaining treatment (type and timing of initiation), length of stay and mortality. Limitations of life sustaining therapy is coded according to the Do Not Resuscitate or DNR code in our hospital. Patients without care limitations have a DNR 0 code. A DNR 1 code implies no CPR in case of cardiac arrest. DNR 2 code restricts specific advanced medical therapies such as intubation, mechanical ventilation, dialysis, use of vasopressors etc according to the medical team's decision. Activation of a DNR 3 code is followed by therapy withdrawal and switch to comfort care.

Results: We identified a total of 368 patients. Patient baseline characteristics are shown in Table 1. 232 patients (63%) had no therapy restrictions while 136 patients (37%) had a DNR code in place at some point during their ICU admission. 10 patients had a DNR 1 code and 59 patients a DNR 2 code imposed on the day of ICU admission. Another 8 patients were coded DNR 1 after a median time of 6 days 19 h; a primary DNR 2 code was given to 43 additional patients after a median time of 9 days. In 16 patients, the primary DNR code was upgraded from 0 to 3 (therapy withdrawal) after a median time of 7 days. In patients with DNR 1 and 2 codes, further limitations in therapy and upscaling to higher levels of DNR code is shown in Figure 1. Patients with a DNR code imposed upon admission typically have a higher CCI scale than patients that receive full care. Frailty scores, however, are similar amongst all groups which is the consequence of a pre-ICU admission screening in which patients with high frailty scores (>6) are typically not admitted to the ICU. Interestingly, despite similar frailty scores, survival was profoundly different between the different DNR codes.

Conclusions: As most DNR coding occurs in the ICU rather than prior to admission, the care planning in the critical ill COVID-19 patient appears to be less 'advanced' than proposed by the SIZ. However, since frailty score was used in the pre-admission screening process, some degree of care planning had occurred prior to ICU admission.

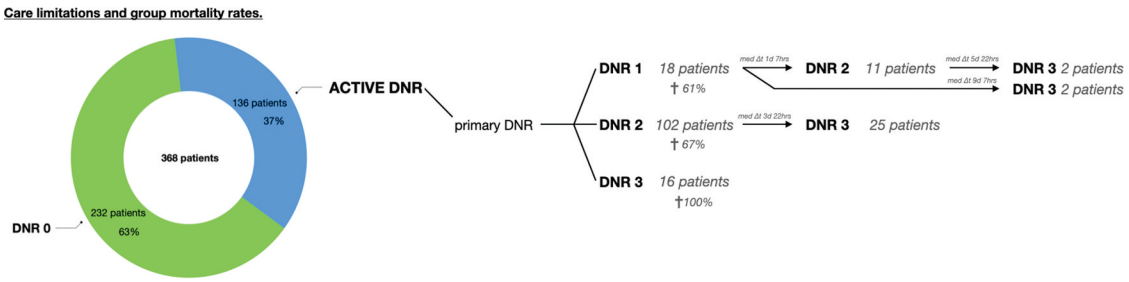

Figure 1. Care limitation and group mortality rates.

Table 1. Baseline characteristics.

Baseline Characteristics.

LOS - length of stay HOS - hospital CCI Charlson Comorbidity Scale	Total group	DNR 0	DNR 1 as primary DNR	DNR 2 as primary DNR	DNR 3 as primary DNR
n° of patients	368	232	18	102	16
LOS HOS, days median (IQR)	14,6 (9,4-25)	14 (9,2-24,6)	16,5 (11,6-24,1)	17,2 (10,5-27,2)	12,8 (6,7-15,6)
LOS ICU, median (IQR)	7,2 (4,7-14)	6,6 (4-11,9)	8,8 (6,3-22,3)	11,8 (5,4-20)	9,7 (4,8-13)
Age, median (IQR)	68 (59-74)	62 (53,8-70)	68 (65-79)	73,5 (70-80)	74 (70-79)
Male/Female (%)	234(64%)/134(36%)	137 (59%)/95 (41%)	14 (77%)/4(23%)	68 (67%)/34(33%)	15 (94%)/1(6%)
BMI, median (IQR)	29 (26,2-32,5)	29,8 (26,5-33,3)	27,6 (26-28,5)	28,1 (25,7-31,2)	28,7 (24,5-32,1)
Frailty, median (IQR)	3 (2-4)	2 (2-3)	3 (3-4)	3 (3-4)	3 (3-4)
CCI, median (IQR)	4 (2-6)	3 (1-4)	6 (3-7)	6 (4-7)	7 (4-9)
Survival ICU (%)	255 (69%)	213 (92%)	7 (38%)	35 (34%)	0 (0%)
Survival HOS (%)	242 (66%)	209 (90%)	6 (33%)	27 (26%)	0 (0%)

25. Pre-hospital triage issue in gastric barotrauma

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Case Report: A 50 year old experienced scuba diver (>1500 dives; called the patient infra) with an instructor level degree started a normal dive accompanied by 2 buddies (normal descent to a depth of 30 m). In order to equilibrate the inner and outer pressure of the tympanic membrane during his descent the patient swallowed small amounts of compressed air (aerophagia). Because the ear equilibration kept being uneven in one ear, the diver experienced alterno vertigo and one sided ear pain. The combination of these symptoms caused the diver to panic at the depth of 30 m, 5 minutes after initiating the dive and he made an emergency ascent, far exceeding the maximal allowed ascending speed of 10 m per minute. On the surface, this emergency ascent caused excruciating epigastric pain and dyspnea. Initial evaluation was done by other experienced divers (which implicates they have basic medical knowledge regarding dive accidents) and a medical doctor who happened to be present:

A clear and safe
B tachypnea (50/'); Saturation 97% at FiO2 21%; bilateral symmetrical thoracal expansion; hypoventilation; no hemoptoe
C heart rate 152/'; capillary refill 3 sec.; Noninvasive blood pressure (NIBP) not available; normal central and peripheral pulses
D pupils equal and reactive to light (PEARL); Glascow coma scale 15/15; no motor or sensory deficit; glycemia not available

In divers training, it is emphasized to give additional oxygen with any major diving incident, so 100% oxygen via a non-rebreathing oxygen mask was applied. First responders including an emergency physician (MUG), found the patient in the same condition as aforementioned with additional vital signs NIBP 115/72 mmHg and glycemia 103 mg/dl. Physical examination showed no signs of an acute abdomen, however the abdominal wall was tense and tender. The patient was transferred to a medical centre with an available hyperbaric oxygen therapy (HBOT) but lacking an emergency room (ER), operating room (OR) and intensive care (IC)-unit. In this centre, the patient was refused because the most adequate care could not be provided and he was sent to the nearest medical center with an ER, OR and IC-unit where he was diagnosed with a stomach perforation caused by barotrauma. Urgent laparotomy was performed and the patient was admitted to the IC-unit for antibiotic treatment and observation.

Pathophysiology and discussion: In the aforementioned case, the pathophysiology is a consequence of the Boyle–Mariotte law (pressure x volume = cte): the swallowed air during the descent of the patient could not escape from the stomach to the mouth or to the intestines in the small time frame of the emergency ascent. This resulted in a quick expansion of the stomach's volume presumably times 4 (depth of 30 m below surface where surrounding pressure is 4 atm. compared to the 1 atm. at the surface). This caused a stomach wall rupture and tense and tender abdominal wall in combination with the excruciating pain. At first evaluation on the diving site, intestinal decompression sickness was hypothesized and because of this reason an emergency transfer was made to a medical center with a HBOT. The prevalence of diving incidents worldwide ranges from 7 to 35 injuries per10000divers ranging from minor (e.g. mask squeeze) to major (e.g. decompression sickness and pulmonary barotrauma) and possibly death (e.g. drowning or sudden heart death) [1]. Because of the altered physics, diving incidents have a number of very specific syndromes and etiologies. Because these are rare, it is difficult for first responders to triage these patients correctly pre-hospital. Only a few case reports about gastro-intestinal barotrauma have been published [2] [3]. Direct consequences of a gastric barotrauma are haemodynamic instability

(blood loss secondary to the gastric wall perforation) and cerebral arterial gas embolism (CAGE), both which can have serious consequences if not diagnosed in an early stage of the incident and preferably at the scene [4] to avoid severe and delayed consequences [5].

Conclusion: Diving incidents can cause symptoms ranging from minor to major pathologies and possibly death. Frequently the morbidity and mortality is time sensitive so a correct pre-hospital triage will make a difference in the outcome of the patient as shown by this case report. This case demonstrates that every gas containing volume in the human body is susceptible to barotrauma. Future research could aim towards a comprehensible flowchart for first responders in order to make an easy to assess but correct triage pre-hospital.

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26. Partial Resuscitative Endovascular Balloon Occlusion of the Aorta for uncontrollable junctional haemorrhage after devastating pelvic crush injury: a case report

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Introduction: Non-compressible junctional haemorrhage is an early cause of preventable death in trauma. Resuscitative Endovascular Balloon Occlusion of the Aorta (REBOA) is an innovative technique that can provide temporary haemostatic control until surgical bleeding control is obtained. REBOA is a minimally invasive technique using a balloon catheter to achieve partial or complete occlusion of the aorta, thereby controlling haemorrhage distal to the balloon and increasing the afterload proximal to the balloon. However, use of REBOA has been associated with vascular complications and evidence is equivocal on the benefit and on the indications. We report a case of a devastating right sided pelvic crush injury with uncontrollable junctional bleeding where REBOA was used in the emergency department (ED).

Case report: A 29-year old male suffered a severe crush injury of the right leg and pelvis when he was crushed between two heavy loads. The right leg was nearly amputated at the level of the groin and the hemipelvis was completely fragmented with massive blood loss at the suprainguinal level. Application of a haemostatic tourniquet was not an option as the bleeding site was too proximal. Manual pressure was applied by the paramedics without success. The patient was awake, the airway was clear and breathing was normal. He was in severe shock without measurable blood pressure. The patient was tachycardic and had no palpable pulse. Tranexaminic acid and intravenous fluids were administered. Due to the extent and the site of the injury, no pelvic binder could be applied. At arrival in the ED there was ongoing blood loss despite adequate local pressure. The patient was agitated after having received ketamine prehospital and maintained his airway. There was no palpable pulse. Local pressure was continued and the massive transfusion protocol was started at a 1:1 ratio (red packed cells:fresh frozen plasma). Fibrinogen concentrate was administered as part of goal-directed transfusion using rotational thromboelastometry showing severe hypofibrinogenemia. Despite the focal manual pressure and massive transfusion, the patient was still in a state of severe shock with a significant volume of continuous blood loss. Therefore we decided to place an ER-REBOA® catheter after placing an ultrasound guided 7 french sheath in the left common femoral artery. The balloon was inflated with 2 ml of fluid at zone 3, which led to a partial occlusion of the infrarenal aorta. The bleeding was significantly less after this manoeuvre and the patient was transferred to the operating theatre. Prior to anaesthetic induction, full occlusion of the abdominal aorta was obtained by increasing the balloon volume to 4 ml. Exploration of the injury site at the groin showed a transected external iliac artery and vein which were ligated. As full surgical bleeding control was obtained, the balloon was fully deflated and removed. Total occlusion time was 26 minutes, of which 6 minutes complete occlusion. Further damage control surgery consisted of a right hemipelvectomy and

of closing the amputation site. The patient was transferred to intensive care with minimal vasopressor support and with the sheath in situ. There were no complications related to REBOA.

Discussion: In partial REBOA (p-REBOA), a balloon is partially inflated to reduce blood loss from the injury site by limiting blood flow distally while preserving some perfusion in the distal uninjured regions. It also increases perfusion pressure proximal to the balloon. In general, p-REBOA generates more physiologically tolerable haemodynamic and ischaemic changes compared to complete occlusion. The alternative is an urgent laparotomy to clamp the aorta. This is an invasive and more time-consuming procedure in a patient where time is extremely valuable.

27. Intracranial subdural empyema in a patient with otitis media and sinusitis: A rare but potential rapidly progressive complication.

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Background: Acute sinusitis and otitis media have a lower prevalence in adults and the use of antibiotics limit complications, which are now mainly ascribed to delayed diagnosis and management of the disease. [1] A thorough history taking and clinical examination, in combination with extensive radiological evaluation (computed tomography [CT] scan or magnetic resonance imaging [MRI]) is always required in patients with suspected complications. [2, 3] Patients with a progressive, complicated disease unresponsive to medical treatment require endoscopic or open surgical drainage for source control. [2, 4]

Case report: A 28-year-old baseline healthy man was referred to the Emergency Department because of mild proptosis of his left eye. He suffered from sinusitis and acute otitis media for one week. At clinical examination, mild proptosis of his left eye was confirmed by the E.R. doctor. A lab test revealed a strong leukocytosis with high C-reactive protein and CT imaging showed inflammatory changes in the left maxillary and sphenoidal sinus, fluid effusion in the left middle ear and mastoidal air cells. Mild proptosis could not be objectified on imaging. Blood cultures were taken. The patient was sent home with oral antibiotics, analgesics and nasal irrigation therapy on the advice of the ear, nose and throat (ENT) specialist. Blood cultures turned positive for Streptococcus pneumoniae one day later. On indication, the patient was called back for admission to the hospital for intravenous antibiotic therapy. Further clinical deterioration occurred with paresis of the right leg on day 4. Repeat CT imaging (with contrast fluid) and MRI were performed, which revealed a subdural empyema of otomastoidal origin. Urgent neurosurgical drainage, mastoidectomy and resection of the underlying cholesteatoma were performed. After a hospital length of stay of 10 days, the patient was fully recovered after two months.

Discussion: This case shows the cardinal importance of a thorough clinical investigation and focused imaging to reveal rapid progression of mastoiditis with intracranial subdural empyema (ISE), which represents a true neurosurgical emergency requiring prompt diagnosis and management. The risk for developing ISE from sinusitis and otogenic infections is significantly low (< 0.1%). [4] In early cases of ISE, CT might not show fluid collection, and repeated CT imaging or MRI should be considered if the patient is clinically deteriorating. MRI has greater sensitivity (93%) and is the gold standard for patients suspected of having ISE. [3, 4] Due to improvements in investigations and early treatment, the actual mortality rate of ISE is approximately 4–9%. [4] The aim of this case report is to alert physicians about a possible rare complication of mastoiditis that could easily be misdiagnosed with fatal outcomes if not treated early.

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28. Repeated consultations at the ER and dysphagia lusoria: a case report.

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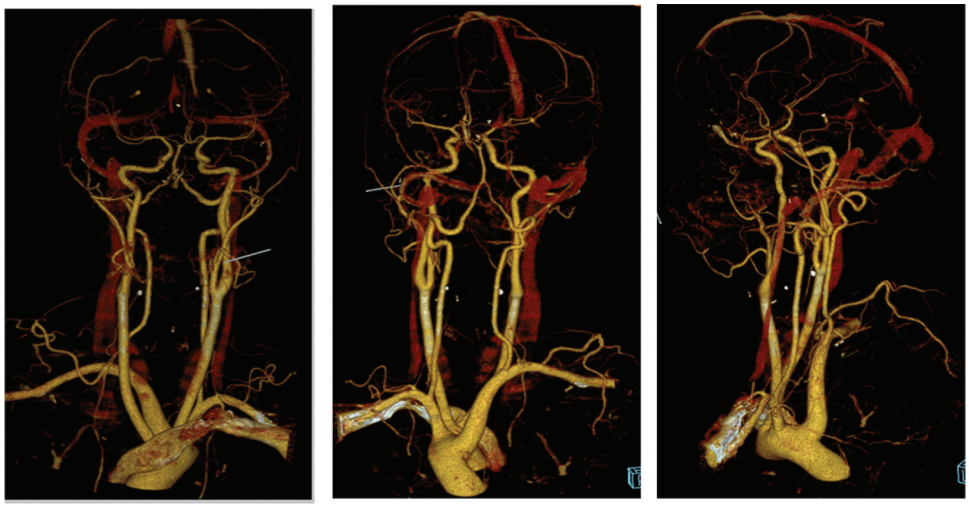
Introduction: Dysphagia is frequently seen in the ER. Dysphagia lusoria is a rare diagnosis of exclusion, caused by a right subclavian artery starting on the left side of the aortic cross and following an aberrant route behind the esophagus.

Clinical presentation: A 27y. man has consulted several times at the ER since March 2020. First for acute nocturnal dyspnea, then for solid food dysphagia: sensation of laryngo-pharyngeal blockage, hemming with every sip, without any voice modification nor stridor nor general symptoms. In the ER, the clinical examinations and blood tests aren't contributive and the ENT suspects a reflux. Later, the OGD finds a H. Pilory and eosinophilic gastritis. PPI, budesonide and antibiotics are started but remain ineffective. A cervical CT without contrast doesn't demonstrate any abnormalities. A barium swallowing shows a lateral right deviation of the cervical esophagus but without stenosis nor lesions. In Feb. 2021, the patient has lost 20 kg and an angio-CT demonstrates an arteria lusoria which, at first, isn't believed to be the cause of the symptoms (images). But due to the persistence of those, a surgical treatment is finally scheduled for Sept. 2021. The artery is transferred to the right and anastomosed to the primitive carotid, drastically improving the dysphagia.



3D reconstruction of the angio-CT demonstrating an arteria lusoria.

Literature key points: Arteria lusoria is the most common malformation of the arc, often silent. It can provoke symptoms (dysphagia, dyspnea, cough, chronical respiratory infections) if the trachea and/or esophagus are compressed. The recommended exams are the CT or MRI with contrast. There is a frequent association with other anomalies of the heart and large vessels which have to be checked. It's only treated in case of symptoms or Kommerell's aneurism. Limited guidelines and studies exist so far. A diet adjustment, medication (such as PPI) or even esophageal dilatation can be tried first, then surgical, endovascular or hybrid interventions.

Conclusion: Arteria lusoria is a rare cause of dysphagia. CT or MRI with contrast are the recommended radiological explorations. Studies about this subject are in limited number.

29. Alpha lipoic acid Intoxication: a Case Report

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Objectives: Alpha-lipoic acid (ALA) has attracted great attention in recent years as an antioxidant molecule. It is available as an over-the-counter dietary supplement. Acute ingestion of high doses can cause significant mortality. In this report, we discuss a case of ALA intoxication to increase awareness.

Setting: A 51-year-old woman was admitted to the emergency department with altered consciousness and agitation after ingesting 12 grams of ALA with an intention to commit suicide. Initial analysis of the patient's blood gas revealed an uncompensated metabolic acidosis. Blood biochemistry analysis revealed a hyperglycemia and elevated creatine kinase. The ECG showed T-wave inversion in the precordial leads. Supportive treatment including intravenous sodiumbicarbonate and aggressive IV hydration were initiated, and the patient was admitted to the intensive care unit. Within the following day, the patient regained a normal mental status and within 48 hours the biochemistry analysis normalized. She was discharged from the ICU without sequelae on the third day of follow-up.

Conclusion: Although ALA is available as an over-the-counter supplement, it might be lethal. Nevertheless, intoxication with ALA is very rare, without pathognomonic signs or specific laboratory findings. To date the diagnosis of an ALA intoxication relies on clinical history. No specific treatment has been described and management is with supportive care.

Keywords: alpha lipoic acid, ALA, drug intoxication

30. Video-assisted phone CPR versus audio-assisted phone CPR in out of hospital cardiac arrest in children: a randomised controlled simulation trial

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Introduction: In adults, phone cardiopulmonary resuscitation (CPR) increases the frequency of initiation and improves the outcome of CPR. Some research has been conducted on video-assisted phone CPR in adults with promising results regarding the quality of CPR. To date, however, none of these studies have included out-of-hospital cardiac arrest (OHCA) in children. The aim of the current study was to investigate any benefit of adding video to standard (audio-only) phone CPR in in OHCA in children.

Methods: A randomised controlled simulation trial was performed from September to December 2021. Cardiac arrest in a child was simulated with the use of a manikin and participants were instructed to follow the instructions of the emergency dispatchers. Of the thirty lay rescuers (age 22 to 59 years), 40% had previously followed a Basic Life Support course. Each participant performed two scenarios; one audio-assisted phone CPR (A-CPR) and one video-assisted phone CPR (V-CPR). The order of the protocols was randomised. Time to recognition of the cardiac arrest and time to start compressions were measured by video recording. The quality of CPR was evaluated using depth of compressions and compression rate as recorded by the manikin, and position of the hand as evaluated by two independent researchers.

Results: None of the measured parameters were significantly different between the two groups. Mean time to recognition of the arrest in the A-CPR group was 94 ± 28 seconds and 95 ± 28 seconds in the V-CPR group (P = 0.40). Mean time to start of the compressions was 136 ± 40 seconds in the A-CPR group and 146 ± 53 seconds in the V-CPR group (P = 0.11). Mean compression depth was 43 ± 9mm in the A-CPR group and 44 ± 8 mm in the V-CPR group (P = 0.27). Mean compression rate was 76 ± 22/min in the A-CPR group and 79 ± 21/min in the V-CPR group (P = 0.21). Correct position of the hand was achieved in 73% percent in the A-CPR group and 77% in the V-CPR group (P = 1.0).

Discussion and conclusions: While previous research has shown a statistically significant improvement in the quality of CPR when using V-CPR in adults, our results cannot confirm this in children. Quality of CPR was low in both groups with inadequate compression rate as well as inadequate depth of compressions. Larger studies are needed to evaluate the usefulness of video during phone CPR in children.

31. The potential influence of automated external defibrillators on the survival rates of out-of-hospital cardiac arrests: a simulation for the municipality of Wetteren.

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Introduction: Out-of-hospital cardiac arrest (OHCA) is a leading cause of death, affecting some 10,000 persons in Belgium each year. The chances of survival after OHCA can be improved by early bystander cardio-pulmonary resuscitation (CPR) and the use of (public access) automated external defibrillators (AEDs). The longer the time between collapse and defibrillation, the lower the survival rate. The Federal Public Service (FPS) Health, Food Chain Safety and Environment in Belgium, which promotes a wider application of public access AEDs, registered between 8,000 and 10,000 such devices. The number of AEDs has been increasing over the last decade, however there is little information on its added value. The purpose of this study is to determine whether the implementation of an AED may improve the outcome after an OHCA. We also ran a simulation to see whether survival rates would increase if every pharmacy were to be equipped with an AED.

Methods: We retrospectively reviewed data of all OHCAs treated with an AED by emergency medical technicians (EMTs) from 1 July 2002 to 31 December 2016 in the municipality of Wetteren. All medical data were collected by the EMTs of local ambulances who arrived first at the scene of a cardiac arrest. We gathered data on the patients' age, the location where they arrested, whether the arrest was witnessed or not, whether there was bystander CPR, the time of arrest, the delay between the arrest, the call to the 112 dispatch center and the arrival of the ambulance and emergency physician-staffed intervention team, the initial rhythm and the final outcome. We focused on patients with an initially shockable rhythm, excluding emergency medical service-witnessed arrests. We indicated the locations of public access AEDs available on 14 March 2021 and the OHCA cases on a map in order to determine the distance between the scene of the OHCA and the nearest public access AED. All distances were calculated as the crow flies and we were working on the supposition that a first responder covers a distance of 100 meter in 1 minute. The location of the registered AEDs was obtained from the FPS, the 'Staying alive' application and the official website of the municipality of Wetteren. We performed verification and checked 24 h/24 h availability by on-site inspection and telephone contact.

Results: Of a total of 146 OHCAs, 43 might have benefited from the use of a public AED. 42 of those patients presented with an initial shockable rhythm; one patient regained a shockable rhythm after initial asystole during CPR performed by the EMTs. In 24 of the 43 cases where patients had a shockable rhythm, the first responder could have availed himself of one of the 37 public access AEDs already present, before the arrival of the EMTs (AED located in 23 cases ≤ 250 m, 14 cases 250 m-500 m and 6 cases > 500 m). If we also take into account the opening hours of the buildings in which the AEDs are located, only 17 of these 24 cases could have benefited from the use of an AED. Eighteen of the 43 patients in our simulation might have benefited from the use of a public access AED located outside of a pharmacy before the arrival of the EMTs equipped with AEDs, so 42%. A minority of the already available public AEDs (32% or 12/37) is clearly indicated or visible from the street. 24 AEDs are located inside a building and only one of them is accessible 24 h/24 h. From our findings, it can be concluded that online resources to locate the nearest defibrillator are incomplete and not up-to-date.

Conclusions: Early defibrillation with a public AED can be a life-saving treatment for OHCA. However, our data show that the public AEDs which are already present in Wetteren may have an added value in only a very small percentage of OHCA cases. There is a clear need for an online platform that will show the first responder the way to the closest AED. We recommend continued efforts to optimize the visibility of the AEDs, to guarantee 24 h/24 h access to these devices, to enhance the geographic distribution of the public access AEDs and to train people in performing CPR and in using AEDs.

32. Isolated gall bladder perforation after minor blunt abdominal trauma: a case where clinical findings beat contrast enhanced CT

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Case: A 75-year-old male was admitted to our Emergency Department following a fall forward upon his face and abdomen while attempting to lift a manhole cover. The patient was known with active alcohol abuse, diabetes mellitus and obesity. He presented with 1,1 g/l ethanolemia. Primary survey was unremarkable apart from agitation and generalized abdominal guarding, rebound and percussion tenderness. CT head and CT cervical spine were reassuring. The on-call radiologist reported the CT abdomen as normal, apart from a small amount of fluid in the peritoneal cavity, accumulated in the peri-splenic and pelvic space (Figure 1(a,b), arrows). In view of the acute abdomen with elevated serum lactate up to 8,5 mM, following blunt trauma without clinical nor radiologic diagnosis the on-call surgeon was consulted to perform

a diagnostic laparoscopy. This intervention disclosed a bile peritonitis caused by perforation of the gall bladder (Figure 2). No further intra-abdominal injuries were identified. Subsequently a laparoscopic cholecystectomy was performed. The patient made an unremarkable recovery with ICU LOS of one day and hospital LOS of five days. In view of these findings, we asked our radiologic team to reevaluate the abdominal images. In retrospect, axial CT in the portal venous phase demonstrates a collapsed gallbladder with a tiny rim of fluid adjacent to the hepatic side (Figure 3(a), arrows) as well as a short hypoattenuation of the anterior wall of the gallbladder (Figure 3(b), arrows). Accordingly both findings may be indicative of dehiscence of the gallbladder wall resulting in collapse of the lumen.

Discussion: The overall incidence of gall bladder rupture in blunt abdominal trauma is reported to vary between 0,5 to 2,1%. This injury is mostly diagnosed during surgical exploration for other visceral lesions1,2. Predisposing factors for gall bladder perforation in blunt trauma include a thin-walled normal gall bladder, gall bladder distension, and alcohol ingestion, which increase the sphincter of the Oddi tone and raise the biliary tract pressure 3,4. Isolated gall bladder injury occurs even more rarely and presents a diagnostic challenge 5,6,7. Though contrast enhanced CT is propagated for diagnosis3, imaging findings are variable 4,5,6,7. However, prognosis of gall bladder perforation is good when managed promptly by cholecystectomy2,3. In addition to previous reports on isolated gall bladder perforation in relatively high energetic or contact sport related blunt abdominal trauma 4,5,6,7, the present case emphasizes that also in 'minor' blunt abdominal trauma clinical awareness for this pathology is warranted to enhance early detection. Even if contrast enhanced CT abdomen in blunt trauma appears to be normal, the value of clinical findings of an acute abdomen with elevated lactatemia should be trusted to perform a diagnostic laparoscopy. Finally, the retrospective description of the gallbladder appearance on CT of our patient may contribute to corroborate the diagnosis in future cases.

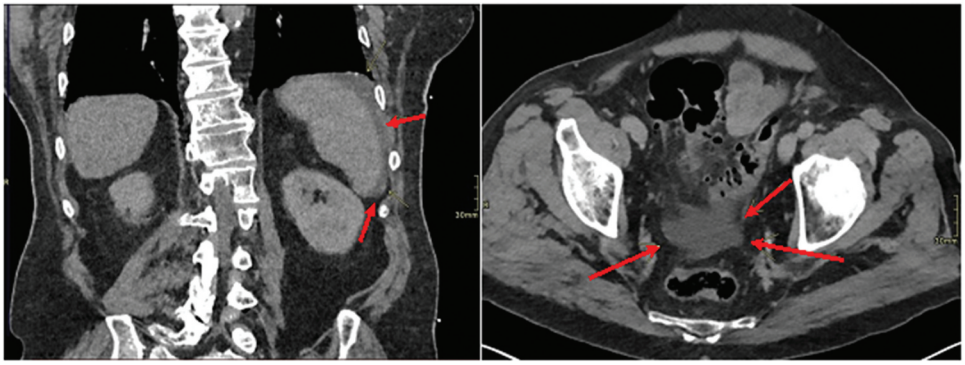

Figure 1. (a and b).

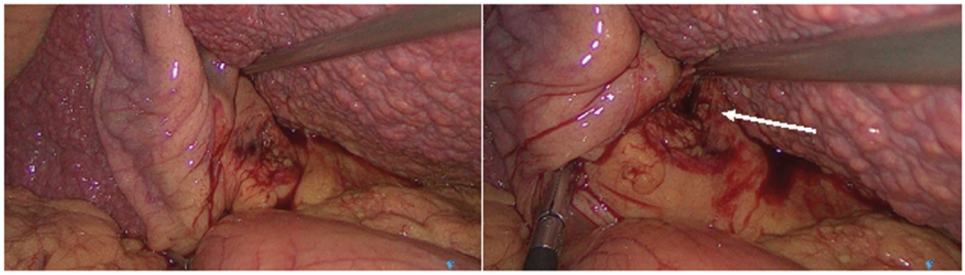

Figure 2.

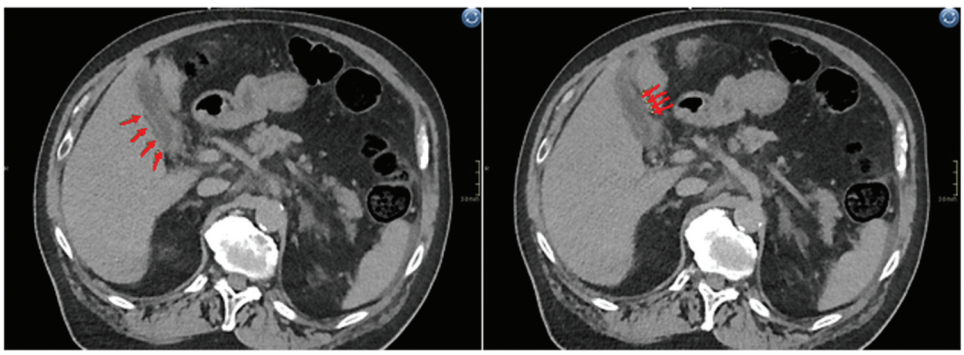

Figure 3. (a and b).

References: [1] Søndenaa K et al.; Eur J Surg 2000;166(11):903–7 [2] Thomson B et al.; J Trauma Acute Care Surg 2012;72(6):1620–1625 [3] Coccolini F et al.; World J Emerg Surg 2019;14:56 [4] Abouelazayem M et al.; Cureus 2021;13(5): e15337 [5] Epstein M et al.: Einstein (Sao Paulo) 2013; 11(2):227–228 [6] Lockie E et al.; Trauma Case Rep 2019;23:100,238 [7] Kohler R et al.; Br J Sports Med 2002;36(5):378–9

33. Experiences and preferences of rescuers and emergency centre dispatchers using video-assisted phone CPR: a qualitative analysis of a simulated trial of resuscitation in children.

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Background: Dispatcher-assisted phone cardiopulmonary resuscitation (DACPR) is an effective strategy to improve the rate of bystander CPR. However, the quality of DACPR remains suboptimal. There is a knowledge gap about the experiences and preferences of rescuers and emergency centre dispatchers using video-assisted DACPR in out-of-hospital cardiac arrest (OHCA) in children. Further research on this topic might enable improving the quality of DACPR.

Aim: To assess experiences and preferences of rescuers and 112 emergency centre dispatchers regarding the use of mobile phone video calls versus traditional phone calls for DACPR in children.

Methods: Data were collected using a structured questionnaire which was answered by thirty adult lay rescuers and five professional dispatchers after they had participated in a simulated OHCA trial. Each participant had taken part in a simulation with and without video assistance.

Results: The majority of rescuers (83%) preferred video-assisted phone CPR over traditional phone CPR. Overall, they felt that video calls provided more direct feedback and increased confidence in their ability to do CPR. On the other hand, 20% of rescuers experienced increased stress during video-assisted CPR, related to appropriate positioning of the camera, whereby following CPR instructions became very challenging. The dispatchers reported that video calls were useful for obtaining information to evaluate the circumstances of cardiac arrest and to facilitate CPR instruction. They thought video assistance improved CPR quality. Dispatchers, however, were concerned about the psychological impact of exposure to potentially disturbing video images. They also feared increased liability.

Discussion and conclusions: Literature data about the experiences and preferences of lay rescuers during video-assisted DACPR are limited. A small study reported excessive stress among rescuers inhibiting the start of CPR (in 29%) due to emotional shock and panic. However, that study investigated audio-assisted phone CPR only. Previous qualitative studies involving dispatchers also found that they preferred video-assisted phone CPR over audio-assisted phone CPR, but these studies were based on the experiences of dispatchers in adult OHCA only. In addition to the potential psychological impact and liability issues related to using video images, previous studies reported increased stress levels among dispatchers, suggesting a need for sufficient training. In the present study, both rescuers and dispatchers reported practical problems which need to be resolved in order to achieve successful implementation of video-assisted DACPR.

34. Are transported COVID-19 patients more at risk of dying?

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*AZ Sint-Jan Brugge

Introduction: The global pandemic caused by the severe acute respiratory syndrome coronavirus 2 confronted healthcare systems with unprecedented organizational challenges, particularly regarding the availability of intensive care unit (ICU) beds [1]. The Belgian government tried to alleviate healthcare pressure by coordinating interhospital transfers from overwhelmed areas towards less saturated ICU wards. Transportation of a patient between medical facilities can be challenging and potentially risky [2]. It remains unclear if these transfers impact the patients' outcome [3]. We aimed to compare the outcome of ICU patients with COVID-19 who were transferred from another healthcare facility to those who remained in the hospital where they were initially admitted.

Methods: A retrospective observational single-center trial was performed from the 1st of October until the 30th of November 2020. We included all COVID-19 patients who were admitted to the ICU of the AZ Sint-Jan hospital in Bruges. The patients were subsequently divided into two groups depending whether they were transferred from another Emergency Department (ED) or not. All transfers were performed by non-specialized critical care transport teams. Primary endpoint was the in-hospital mortality. Secondary outcomes were the pO2/FiO2 rate, the need for intubation, the length of stay (LOS) in the ICU and in the hospital and the need for VV-ECMO.

Results: Thirty-six patients were enrolled, 15 in the transfer group and 21 in the non-transfer group. The overall average patient age was 65 years (SD 14 years) and 26 (72 %) of them were male. The average transport distance and time were 90 kilometers (SD 33 kilometers) and 70 minutes (SD 30 minutes) respectively. There were no major adverse events during transportation. The mean PO2/FiO2 at presentation in our hospital was 130 (SD 71) after transfer and 190 (SD 93) in the non-transferred group ($p = 0.03$). Seven transferred patients (47 %) and 8 non-transferred patients (38 %) died ($p = 0.61$) during hospitalisation. Fourteen transferred patients (93%) and 9 non-transferred patients (43 %) were intubated during their stay in the ICU ($p = 0.002$). The mean ICU and hospital LOS in the transferred group was 39 days (SD 16 days) and 42 days (SD 16 days) compared to 19 days (SD 22 days) and 22 days (SD 22 days) in the non-transferred group ($p = 0.003/p = 0.003$). Five transferred patients (33 %) and 1 non-transferred patient (5 %) needed VV-ECMO ($p = 0.02$).

Discussion: Our study didn't show a higher mortality rate of transported COVID-19 patients, but may be underpowered to demonstrate a significant difference. However, transfer strategy does not seem to impact patient mortality [4]. Meanwhile, the pO2/FiO2 rate, the need for invasive ventilation or salvage VV-ECMO as well as the ICU and hospital LOS were significantly increased in the transferred group. In fact, transport of critically ill patients are not without risk and can increase ICU and hospital LOS [5]. Selection bias is likely to play a role as only those patients who couldn't be managed in the ward with high-flow nasal cannula oxygenation were transferred. The transportation of unstable patients by non-specialized transport teams can worsen the already detrimental outcome. Hence, transport by a specialized critical care transport unit could benefit the patients [2].

Conclusion: Transport of COVID-19 patients is not risk-free and constitutes a potential adverse outcome. Transferring patients into non-overwhelmed areas is a valuable strategy to face a pandemic if the transfer is happening in well-controlled circumstances, after respiratory stabilization if possible and by a proper specialized transport unit.

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35. TIPIC syndrome, a rare cause of atypical neck pain – clinical report of two cases in a Belgian emergency department

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Introduction: Transient Perivascular Inflammation of the Carotid Artery (TIPIC syndrome) is a rare cause of neck pain. Patients may also have associated symptoms such as dizziness, vertical diplopia or contralateral-sided dysesthesia. The exact pathogenesis is poorly understood, data on prevalence are non-existent. There might be an association with underlying autoimmune disorders.

Case report: A 47-year-old female presented with sharp right-sided pain in the neck, radiating to the right ear, and fatigue for 3 days. Clinical examination revealed a tender swelling lateral to the thyroid gland. Laboratory results were normal. Ultrasound (US) demonstrated a remarkable thickening of the carotid wall at the level of the carotid bifurcation with infiltration of the perivascular fatty tissue (fig. 1). Computed tomography (CT) angiography ruled out carotid dissection and showed infiltration of the soft tissue surrounding the distal common carotid artery, carotid bifurcation and the

proximal part of the internal and external carotid artery. The patient was treated with acetaminophen and non-steroidal anti-inflammatory drugs (NSAIDs) as needed. Follow-up after six weeks showed intermittent episodes of pain and tenderness, which was treated with a two-week regimen of ibuprofen 400 mg 3 times a day. A second patient, a 38-year-old female presented with left-sided neck pain for 6 days, especially when moving, and localized tenderness below the left mandible. Clinical examination demonstrated localized tenderness when palpating the distal carotid artery and localized swelling. Ultrasonography showed a heterogenous aspect and hyperemia of the thyroid, as well as focal thickening of the wall of the left distal common carotid artery and carotid bifurcation. Laboratory results were unremarkable. CT angiography revealed eccentric thickening of the carotid wall and perivascular soft tissues (fig. 2). She was treated with acetaminophen and diclofenac, with complete resolution of symptoms in 4 days.

Discussion: Originally, TIPIC was reported by Fay in 1927 under the rather descriptive term carotidynia. Recent evidence of radiological findings suggest a new, distinct underlying entity, which can be diagnosed on US, magnetic resonance imaging (MRI) or CT angiography, called TIPIC syndrome. TIPIC syndrome is characterized by inflammation of the vessel wall and the perivascular tissues and presents as acute onset unilateral tenderness near the carotid artery. The differential diagnosis includes carotid artery dissection, aneurysm, vasculitis, thyroïditis, sialadenitis, head and neck tumoral mass or infection, adenopathies or cervical osteoarthritis. Symptoms usually respond to non-steroidal anti-inflammatory drugs (NSAIDs). TIPIC syndrome is a self-limiting disease of which the emergency physician should be aware when treating patients with atypical, intense neck pain. The diagnosis can be made on different imaging studies (US plus CT angiography or MRI). Imaging and laboratory studies can help in ruling out alternative causes, especially carotid artery dissection, autoimmune diseases or vasculitis. Follow-up can be performed by both the vascular surgeon or the rheumatologist.

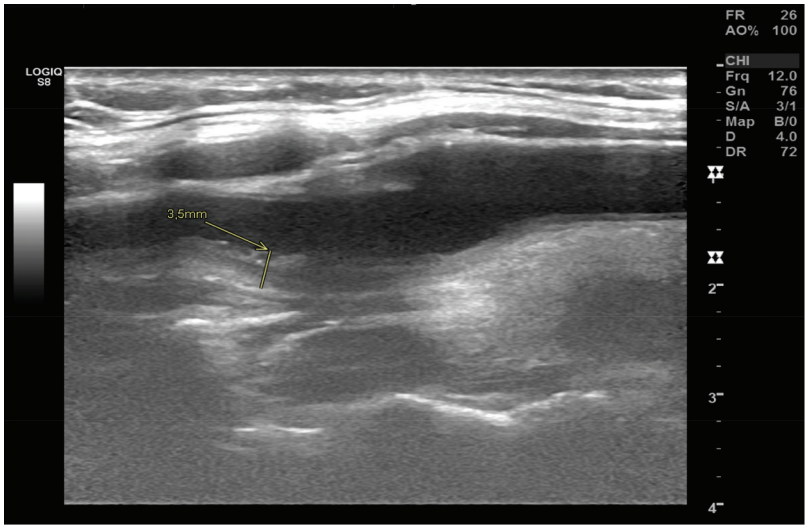

Figure 1. Sagittal ultrasound image of case 1 of the right common carotid artery, carotid bulb and proximal internal carotid artery, demonstrating thickening of the carotid wall and perivascular soft tissues up to 3,5 mm, with minimal luminal narrowing.

Figure 2. Axial CT-angiography of case 2 at the level of the distal carotid arteries, demonstrating eccentric thickening of the carotid wall and perivascular soft tissues on the left (arrows), with mild luminal narrowing.

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36. Cerebral hyperperfusion syndrome after carotid endarterectomy presenting with ipsilateral subarachnoid hemorrhage and contralateral vertebral artery occlusion.

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Introduction: We present a case of cerebral hyperperfusion syndrome (CHS) presenting with left-sided paresis and partial seizures. CHS is a rare but potentially devastating complication of open and endovascular reperfusion procedures of the carotid artery and is caused by an increased cerebral blood flow and impaired cerebrovascular autoregulation. Emergency physicians should be aware of this syndrome in patients presenting with neurological signs after carotid artery reperfusion procedures. The diagnosis is challenging as CHS develops hours to weeks after surgery and because the clinical presentation varies. Initiation of supportive, antihypertensive and anticonvulsant therapy when indicated are crucial as development of intracranial hemorrhage and cerebral edema are associated with poor outcome.

Case report: A 66-year old female was referred by the ambulance service with acute paresis of the left arm and the left leg followed by localized twitching of the left arm. She underwent a right-sided open carotid endarterectomy (CEA) four days earlier for a high-grade stenosis of the right carotid artery. Preoperative magnetic resonance imaging showed semi-recent ischemic lesions. The postoperative course had been unremarkable and aspirin had been initiated.

She was fully conscious on arrival at the emergency department but clinical examination showed forced gaze deviation to the left and partial seizures of the left arm and leg. The patient developed generalized seizures shortly thereafter, treated with intravenous midazolam. She was normotensive throughout this course. Computed tomography (CT) angiography of head and neck was performed and compared to preoperative imaging. No recent ischemic lesions were present, but limited subarachnoid hemorrhage (SAH) at the right frontal cortex and occlusion of the left vertebral artery at the level of C4-C5 were noted. After the patient regained full consciousness, no residual focal neurological deficit was noted. She told the left-sided paresis and twitching was preceded by a sudden onset of severe headache a few hours earlier. The combination of acute headache, focal neurological deficit and partial seizures after recent CEA with ipsilateral cortical SAH led to the diagnosis of CHS. The occlusion of the contralateral left vertebral artery was attributed to result from lower demand of the collateral circulation due to ipsilateral carotid reperfusion. Antiepileptic drugs were initiated, antiplatelet therapy was continued and the patient was admitted for further management and tension control.

Discussion and conclusion: Clinical presentation of CHS varies and can involve reduced consciousness, confusion and headache, but also hemiparesis mimicking acute stroke or partial and generalized seizures. Hypertension is a risk factor but the syndrome may also develop in normotensive patients. The combination of sudden onset headache, left hemiparesis and partial seizures with ipsilateral cortical SAH on imaging was indicative. Due to lower demand of the collateral flow after reperfusion of the right carotid artery, the left vertebral artery occluded postoperatively.

37. Implementation of a treatment protocol in the ED to reduce admission rate of recent onset atrial fibrillation: a literature review

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Introduction: Atrial fibrillation (AF) is the most common dysrhythmia in patients presenting to the Emergency Department (ED). It causes significant morbidity and mortality, but it's also responsible for a large portion of the yearly cardiovascular healthcare expenditure. In 2022 there is still no commonly accepted guideline available for treatment of recent-onset AF in the ED, leading to treatment variations and unnecessary admission of patients.

Methodology: A systematic literature review was undertaken to identify papers studying the effect of implementing a treatment protocol for recent onset AF in the emergency department on the admission rate. Articles in English, Dutch and French were considered for inclusion. Only papers with a pre- and post-implementation study were included. We performed a systematic search of PubMed using the following MeSH terms: 'atrial fibrillation/therapy', 'emergency service, hospital' and 'treatment protocol'. This yielded 251 results, of which five articles were selected based on in- and exclusion criteria. Review of the references identified one additional article for inclusion.

Results: Reported percentages of hospital admission before implementing a treatment protocol range from 42,3% to 85%. Treatment protocols between studies vary, and include both rate and rhythm control strategies. Protocols were written by multidisciplinary expert panels and were based on their expert consensus and guidelines by the American Heart Association or the American College of Cardiology. After implementation of the protocol, researchers noted a significant decrease in hospital admissions in all six studies, ranging from 28,4% to 67,4%. Anticoagulation policy was based on the CHADS2 score in 1 study, on the CHA2DS2-VASc score in 2 studies, and in 1 study the decision to start anticoagulation was postponed to the follow-up consult. Anticoagulation was not mentioned in two papers. Two studies reported serious adverse events pre- and post-protocol implementation, and there was no difference.

Discussion: Five out of six studies were conducted in tertiary care facilities with a 24h on-call cardiologist and sufficient nursing staff to monitor the patients, which would not be possible in a small community ED. Therefore, the implementation of a universal protocol will most likely not be possible, but should be tailored to fit the specific ED, based on its around-the-clock availability of medical and nursing staff, and monitoring capacity. Even though the treatment protocols vary between studies, they all rely on the availability of short-term follow-up in outpatient clinics for early re-evaluation of patients.

Conclusion: Implementation of a treatment protocol can lead to a significant decrease in urgent hospital admissions, and may healthcare cost reduction. Although the need for a solid evidence-based treatment guideline for an ED context is still desperately warranted.

Disclosure statement

No potential conflict of interest was reported by the author(s).

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