ICU Cares eP-035

Automatic anemia identification based on machine learning algorithm on red blood cell image

Rifaldy FAJAR, Dewi Mustika SARI, Nana Indri KURNIASTUTI

Computational Biology Laboratory, Yogyakarta State University, Indonesia

Background: In general, laboratory tests to identify anemia are done by manually counting the number of red blood cells, which is called the Complete Blood Cell (CBC) method, and automatically using a device called a blood analyzer. Manual calculation of the number of red blood cells in a blood sample under a microscope by a doctor takes a relatively longer time than an automatic examination. However, automatic inspection is relatively expensive. This research work proposes a computerized algorithm to perform an efficient and low-cost anemia identification.

Methods: Our algorithm consists of three main phases, namely image processing, feature extraction, and identification. The image processing phase is done in two steps, the image pre-processing and segmentation steps. The feature vector of all images is constructed based on the pixel intensity values of the segmented images. The constructed feature vector becomes the input of the identification phase, which is performed using the K-Means method. The proposed algorithm is applied on 92 red blood cell images, consist of 52 and 40 anemia and non-anemia images, respectively.

Results: The identification results are validated by comparing them to those of the medical staff. The achieved accuracy for the validation process is 95%, indicating that our proposed algorithm is able to identify anemia and non-anemia effectively.

Conclusion: In this study, the results obtained with very good accuracy so that the system is able to detect very well.

ICU Cares eP-036

Aleukemic leukemia presenting with polyarthritis and pathological fractures: A case report

Babak SANDOUGHCHIAN, Leila MAHBOOBI, Faramarz AJRI-KHAMESLOO

Department of Pediatrics, Bouali Children's Hospital, School of Medicine, Ardabil University of Medical Sciences, Iran

Introduction: About %30 of patients with leukemia initially present with musculoskeletal signs and symptoms as medullary involvement including limping, bone or join pain and fractures.

Case Presentation: The patient was a 10 year old boy that present with polyarthritis and pathological fracture of his wrist and vertebral body bones (Figure 1). Peripheral blood test revealed no abnormal cells, bone biopsy at the fracture site only showed small aggregates of unremarkable lymphocytes. A bone marrow study couldn't provide a definitive diagnosis of acute leukemia on morphology and immunohistochemistry. Diagnosis of precursor B-cell ALL (Acute Lymphoblastic Leukemia) was unequivocally confirmed by bone marrow biopsy.

Conclusion: ALL is the commonest childhood cancer. Common presentations include; fever, bleeding and lymphadenopathy, while about %30 of patients presented with bone or joint pain. However, musculoskeletal symptoms can be the only presenting feature of ALL, causing a delay in diagnosis.

Figure 1

Figure1: Plain radiographs demonstrating distal interphalangeal joint effusion and soft tissue swelling and pathologic fracture of vertebral body and wrist.

ICU Cares **eP-037**

The incidence of postoperative cardiac arrest and pre-resuscitation factors associated with post-cardiopulmonary resuscitation mortality: A single-center study in Thailand

Chanya CHOMCHOEY. , Thammasak THAWITSRI.

Anesthesiology, Faculty of Medicine, Chulalongkorn University, Critical Care Excellent Center, King Chulalongkorn Memorial Hospital, Thai Red Cross Society, Thailand

Background: The author aimed to determine the incidence of in-hospital postoperative cardiac arrest requiring cardiopulmonary resuscitation (CPR), postoperative CPR mortality and pre-resuscitation factors associated with post CPR mortality.

Methods: A retrospective cohort study was conducted at King Chulalongkorn Memorial Hospital in Thailand from September 2018 through August 2020. A total of 34,590 adult patients underwent surgical procedures under anesthesia were recruited by electronic data recorded review. A subset of patients with postoperative CPR was collected for demographic data, comorbidities, ASA classification, operative time, functional class, types of surgery, postoperative complications, the number of deaths and survival, and Search Out Severity (SOS) score at 4 hours preceding cardiac arrest.

Results: A total of 34,590 adult surgical patients were recruited. In-hospital postoperative cardiac arrest incidence was 12 patients per 10,000 surgeries and predominated in emergency operation (28 per 10,000 surgeries; $P < 0.0001$). Risk ratio of emergency operation resulted in postoperative CPR was 3.15 (95% CI 1.72-5.77; $P < 0.001$). Postoperative cardiac arrest patients aged 64.07 ± 16.58. The BMI was 23.46 ± 5.83. Mostly they were in ASA category 3 (44.2%). Everyone had general anesthetic procedures. In-hospital postoperative CPR mortality was 62.8%. Factors possibly predisposed to it were functional class < 4 METS, colorectal surgery and SOS score at 4 hours prior to cardiac arrest of at least 8.

Conclusion: Incidence of in-hospital postoperative cardiac arrest and mortality after CPR in the study was lower than that of previous studies. In addition, emergency operations notably predisposed to cardiac arrest. SOS score was possibly valuable as a prognostication tool, ICU triage, and a part of the early warning score to prevent the overwhelming crisis. Surveillance for patient's deterioration, effective rapid response system, as well as, comprehensive preoperative preparation should be emphasized.