

and emergencies, and manage a pertinent medical response effectively. The list of these instruments traditionally comprises: computerized databases, geographic information systems (GISs), graph theory, complex networks, mathematical programming, simulation, and agent-based modeling. As a rule, each type of those is applied asunder. It makes sense to put in one silo diverse instruments to get multidisciplinary solution with its synergy effect for problems of disaster and emergency medicine.

**Methods:** Within this study, an original, agent-based model was developed. The model combines the advantages of the principal computer-aided instruments and considers all the types of information: semantic, topographical, metric, and topological. The model is severely dynamic, fits to real actors and principally covers all the disaster situation.

**Results:** In line with the model, a so called Topometric Agent-Based System (TABS) with its key visualization component has been designed. A TABS-specific simulation to investigate behavior of the attacked network of vulnerable actors has been conducted leading to critical findings. It has been shown a severe significance of order within combination of threats: man-made + natural or those of natural + man-made. A well-balanced financial distribution to protect actors of diverse status also has been found.

**Conclusions:** A TABS similar to GIS focuses on mapping. Topometric Agent-Based System mapping brings an efficient and clear language for information sharing not only within national emergency medical services but between experts from different fields and countries.

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#### (P2-72) Diagnostic Accuracy of Bedside Ultrasound for Identifying Fractures in Patients with Orthopedic Trauma Presenting to the Emergency Department of a Level-1 Trauma Center - Aims Ultrasound Fracture Study

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**Background:** Radiography is the standard observation tool for examining orthopedic injuries. Bedside Ultrasound (BUS) may be a faster, non-invasive alternative to effectively identify bone fractures in the emergency department (ED) setting. The study compares the diagnostic utilities of BUS and radiography for identifying long bone fractures.

**Methods:** Prospective observation study with convenience sampling was conducted in ED in patients > 5 years, with post-traumatic upper and lower limb injuries requiring standard radiological examination after informed consent. The BUS examinations were performed by a emergency physician (EP) who had a brief training session to detect fractures. For every subject, radiographs were taken and reviewed for the presence of fracture by blinded orthopedic specialist. Statistical analysis was done by SPSS.

**Results:** A total of 133 patients were enrolled in the study. Only 42 had fracture, out of which 36 were picked up by BUS. The overall sensitivity of the BUS in detecting fracture was 85.7% with a confidence interval (CI) of 0.70–0.94 and specificity of 100% with a CI = 0.95–1.00. The positive predictive value (PPV) of USG was 100% with a CI = 0.86–1.00 and negative predictive value (NPV) of 93.8% with a CI = 0.86–0.97. There were six additional fractures which were recognized on x-ray and were not picked up by ultrasound.

**Conclusions:** BUS can be utilized by EP after brief training to accurately identify long-bone fractures. It may gain a more prominent role in pregnant and pediatric population as well as in mass-casualty scenarios.

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#### (P2-73) Ocular Nerve Sheath Diameter for Evaluation of Raised Intracranial Pressure in Patients Presenting to the Emergency Department - A Prospective, Observational Study

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**Background:** Ultrasonography of optic nerve sheath diameter (ONSD) may be useful in detecting raised intracranial pressure (ICP) in head injury (HI). There is limited data from India.

**Objective:** The objective of this study was to evaluate the utility of measuring ONSD for diagnosis of raised intracranial pressure in HI victims in the emergency department.

**Methods:** Fifty-two HI patients presenting between February to August 2009 were included, A CT head scan was performed and simultaneous ocular ultrasound was done by an emergency physician who had underwent goal-directed training in ophthalmic sonography by a linear probe of 10 MHz. An ONSD greater than > 5 mm for patients > 15 years of age, 4.5 mm for 1–15 years of age, and 4 mm for infants were considered abnormal. The two modalities of diagnosis were compared.

**Results:** The median age was 30 years (Range = 0.25–72 years). A total of 90.4% were male and 9.6% were female. A total of 71.2% had severe HI, 19.2% had moderate HI, and 9.6% had mild HI. A raised ICP based on CT findings was present in 42 (80.8%) patients. Mean optic nerve diameter in patients with raised ICP was 5.11 + 1.56 mm compared to 5.04 + 1.6 mm in patients with no features of raised ICP. Sensitivity and specificity of ONSD as a screening test for detection of raised intracranial pressure were 57.1% and 40%, respectively with a positive predictive value and negative predictive value of 80% and 18.1%, respectively.

**Conclusions:** The evaluation of the ONSD diameter is a simple and non-invasive potential tool in initial assessment of raised intracranial pressure.

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