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Final results of the prospective study on the role of bed side ultrasound (BUS) in neutropenic enterocolites (NEC). Early US diagnosis reduces the mortality and changes the diagnostic criteria with a new discriminant statistical model

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Introduction: Neutropenic enterocolitis (NEC) is a life threatening complication of leukemic and solid tumors patients (pts) treated with chemotherapy (CHT) with mortality rate up to 50%. NEC is characterized by abdominal pain (AP), fever (F) and diarrhoea (D). Ultrasound (US) was used to evaluate bowel-wall thickening (BWT), and > 4 mm is considered diagnostic of NEC. Perforation occurs in 5%>10% of cases. Early diagnosis is crucial to start conservative medical management (CMM) which appears the optimal strategy for most cases. We evaluated prospectively if Bed-side-US(BUS) can detect early signs of NEC and guide a prompt treatment (CMM or surgical) in order to reduce mortality

Materials (or patients) and methods: In the last 7 years all pts admitted in Our Hematology/BMT Unit wards at University of Pisa (Italy), undergoing chemotherapy (CHT), autologous or allogeneic transplant (AutoTx,AlloTx) were enrolled. Abdominal US was performed, baseline before treatment, and as only one symptom (or a combination) appeared within 12h from onset: F and/or D and/or AP in CHT-related neutropenic pts.

Results: 76 episodes out of 1680 neutropenic pts were identified (4.7%). Seven pts had 2 separate episodes of NEC. Disease diagnosis were HD (N=10), ALL (N=8), AML(N=21),MM (N=9) and NHL (N=28). Treatment received was intensive CHT (N=35), AutoTx (N=37) and AlloTx (N=4). At time of diagnosis (Dx) symptoms were: F+AP+D 48%, F+D 4%, F+AP 1%, AP+D 34%,D 3%,AP 9%. F alone were never present at diagnosis of NEC. At Dx, F was absent in 35/76 NEC episodes (46%) and in 17/76 F never developed and 18/76 had delayed onset of F (from 10h to 72 h) from NEC Dx. There is a trend but not a statistical (St) significant difference in mortality among the 3 F groups (P=0.09). As control group (CG) we considered pts with CHT related mucositis and pts restaged with US during neutropenia in absence of symptoms. A total of N=509 pts were randomly chosen in the CG. None of them had BWT. Overall 11 pts died (14.5%) without a St difference between 1 or 2 episodes (P=0.309) of NEC. Treatment was CMM in 92% of pts, and was promptly started as BUS diagnosis was made. Mortality in pts treated with CMM was 11.5%. Six pts underwent surgery, guided by US features, during neutropenia, and 50% are alive. Median BWT was 8.6 mm in surviving pts (range 4.2-30mm) and 11mm in deceased (range 9.3-15mm). Authors have suggested BWT to be prognostic of outcome; in our study pts with >10mm had 60% survival. Median time to response from beginning of CMM was 24h and the first sign of was a decrease in AP, while median time to death was 26h (range 10.5-72h). The likelihood of NEC Dx in a discriminant St model (Bayes theoreme) for pts with BWT and AP=98.8%, AP+D=99.9%, AP+D+F=100%, AP+F=99.9%, D+F=5%.

Conclusion: BUS allowed to detect early signs of NEC and to start a prompt treatment, which was CMM in 92% with a 88.5% survival rate. With BUS pts do not live the isolation room. US guided surgical intervention with 50% survival rate. Images of BUS and CT were superimposable. Fever is not a condition sine qua non for NEC diagnosis. A prompt BUS in

neutropenic patients as just one symptom presents allows to make early diagnosis of this life threatening complication and guide prompt treatment (conservative or surgical) reducing mortality.

Disclosure of Interest: None Declared

Keywords: bone marrow transplant, neutropenic enterocolites, ultrasonography