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Opinion Article

The Impact of Idarubicin and Epirubicin in Patients with Paediatric Acute Lymphoblastic Leukaemia

Ceppi Francesco*

Department of Pediatrics, Lausanne University Hospital, Lausanne, Switzerland

DESCRIPTION

Acute Lymphoblastic Leukemia (ALL) in children is treated with anthracyclines, which are regarded as crucial chemotherapeutics. Epirubicin (EPI), Daunorubicin (DNR), and idarubicin are the three most widely utilized medications. Over the past 50 years, pediatric ALL treatment outcomes have significantly improved, mostly as a result of the introduction of anthracyclines. However, sporadic DNR shortages over the previous decade years have pushed the use of IDA and EPI as anthracycline substitutes. Due to its decreased cardiotoxicity and superior anti-leucocyte activity, prior literature suggests that IDA may be preferable than DNR.

Although IDA and EPI are frequently used interchangeably, there is a lack of high-level data to support proper EPI/IDA interconversion. IDA is also more expensive than DNR and EPI. Due to the 4'-C atom, EPI is structurally distinct from DOX; in DOX, the OH is bonded to this group and is orientated in the axial configuration, but in EPI, it is in the equatorial configuration. Although the formula and weight are unaffected by this slight modification of the molecular structure, the activity is greatly affected. Aside research has revealed that epirubicin is less hazardous than doxorubicin. Many clinicians are worried about whether a decrease in toxicity will result in a decrease in efficacy, though. Few studies have directly contrasted the toxicity and effectiveness of combination chemotherapy based on IDA versus EPI. Anthracyclines have been the first-line treatment for ALL in children ever since the 1960s. Patients at intermediate and high risk have reportedly had better results when receiving enhanced anthracyclines as induction treatment. Because anthracyclines can have antitumor effects by inhibiting DNA synthesis in the early stages of ALL treatment. Anthracyclines may raise the risk of infection or mortality from hematologic toxicity, but they are also very myelotoxic. Additionally, it's important to take anthracycline-induced cardiomyopathy seriously because it's a serious complication that sometimes results in early death and can harm quality of life.

Acute cardiotoxicity is a potential side effect of anthracycline therapy and may potentially start right away after chemotherapy. Anthracyclines can cause cardiac dysfunction even at low doses. According to one study, myocardial enzymes and diastolic measures are more likely to suggest early cardiotoxicity than systolic parameters. Since EPI's approval in France in 1982, it has been used to treat breast cancer and other cancers in more than 80 nations. Although IDA entered clinical trials for leukemia for the first time in 1982, there haven't been many carefully planned trials that have precisely examined the efficacy and toxicity of these two drugs, which have been used to treat pediatric ALL, for decades. In terms of B-Type Natriuretic Peptide (BNP) levels, there was no discernible difference between the two groups before and after treatment. A BNP level in the IDA arm that was ten times greater after induction than the other patient, whose bone marrow was not in remission, and whose therapy was accompanied by severe bone marrow suppression, were the two patients who stood out. The only unusual patient in the EPI arm had a severe Acinetobacter baumannii infection, and whiles the BNP level significantly increased from 595 pg/ml prior to therapy to 35000 pg/ml after treatment, the Left Ventricular Ejection Fraction (LVEF) did not concurrently exhibit a discernible decline. In summary, acute myelosuppression was equivalent between IDA and EPI regimens, and Conversion Rate (CR) rates were similar between the EPI and IDA procedures. The use of dexamethasone and prednisone, as well as the timing of Measurable Residual Disease (MRD) detection were minor variations between the two induction regimens, but they were not thought to have an impact on results.

Correspondence to: Ceppi Francesco, Department of Pediatrics, Lausanne University Hospital, Lausanne, Switzerland, E-mail: francesco@gmail.com

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