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Angiogenesis and cancers: Comparing the anti-angiogenic efficacy of Efavirenz to Thalidomide

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Statement of the Problem: HIV infection has been associated with Kaposi's sarcoma (KS), cervical cancer and non-Hodgkin's lymphomas. WHO guidelines on ART recommends efavirenz as a first-line drug in HIV management therapy for all ages, gender, and gestational age. Nevertheless, Efavirenz has not been adequately studied in cases of advanced HIV disease (CD4 counts < 50 cells/mm3) and after the failure of other regimens.

Methods: This study compares Efavirenz, marketed as Sustiva to the known anti-angiogenic and anti-cancer agent, thalidomide. With animal ethics clearance (No 2008/7/1), 30 chicks chorioallantoic membrane (CAM) was used as an *in vivo* vascular test environment to test the effect of Efavirenz (marketed as Sustiva) in comparison to that of thalidomide (Sigma-Aldrich, T144). CAM images were captured on day 5 and 15 of treatment. Results were analyzed using the one-way Analysis of Variance and Fischer exact test ($p \leq 0.05$).

Results: Fischer exact test showed an association between treatment drugs and CAM angiogenesis ($p<0.05$). Unlike thalidomide, efavirenz suppressed both angiogenesis and erythropoiesis, reducing mean CAM blood vessels score to 0.0.

Conclusion: Angiogenesis inhibitors are potent anti-cancer agents. This study showed Efavirenz to be a more potent anti-angiogenic agent than thalidomide, possessing an absolute anti-angiogenic effect in the developing chick CAM. And unlike thalidomide, it suppressed erythropoiesis. This awards Efavirenz an additional score when compared to thalidomide. From this work, we conclude that there is a possible future clinical use for Efavirenz as an anti-cancer drug, and with no fear of adverse effects for pregnant women and their babies, in utero.

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