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RESEARCH ARTICLE

EVOLUTION OF CLINICAL PARAMETERS OF 131 PATIENTS UNDERGOING ANTIRETROVIRAL TREATMENT AT THE NATIONAL BLOOD TRANSFUSION CENTER OF ABIDJAN

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Abstract

A descriptive study was conducted on HIV patients who had started antiretroviral therapy (ART). This study included a sample of 321 patients selected from the cohort of HIV-infected patients followed at the Medical Center for the Follow-up of Blood Donors (CMSDS) of Abidjan (RCI), in the period from 2005 to 2012. These patients were regularly treated, according to their status, with seven (07) ARV therapeutic combinations which are AZT-3TC-EFV; AZT-3TC-NVP; AZT-3TC-NFV; AZT-3TC-LOP/RIT; DT4-3TC-EFV; DT4-3TC-NVP; FTC-TDF-EFV. Regular follow-ups were performed during 36 months of treatment and clinical parameters (Karnofsky Index, Body Mass Index, Brachial Perimeter) were measured every six (6) months. The evolution of these three parameters (KI, BMI and BP) is a good indicator of the effectiveness of the treatments, as they allow patients to maintain a good clinical condition.

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Introduction:-

In West Africa, particularly in Côte d'Ivoire, efforts to combat HIV as part of the national response are noticeable. The Ivorian government has made access to antiretroviral drugs (ARVs) completely free since 2008. Some sub-Saharan African countries have also implemented a national policy for the care of HIV-infected patients with relative success (**Laurent Candal, 2002 ; Seyler Candal, 2003**). Indeed, there are nearly 3 million people on ART in developing countries, including nearly 2 million in sub-Saharan Africa (**WHO, 2008**). However, in Côte d'Ivoire, little work has been done to evaluate the health impact of these drugs. In order to contribute to the knowledge of the effects of ARVs, a descriptive study was conducted on HIV patients who had started antiretroviral treatment (ART). These treatments involved seven (07) therapeutic combinations of ARVs (AZT-3TC-EFV; AZT-3TC-NVP; AZT-3TC-NFV; AZT-3TC-LOP/RIT; DT4-3TC-EFV; DT4-3TC-NVP; FTC-TDF-EFV), administered to these HIV-positive patients and followed up for a period of thirty-six (36) months

Material And Method:-

Sampling

The study included a sample of 321 patients from the Centre Médical de Suivi des Donateurs de Sang (CMSDS), based at the Centre National de Transfusion Sanguine in Abidjan.

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Adult patients infected with HIV-1 and/or HIV-2, female and male, who started ART for the first time and were followed up in the above-mentioned recruitment center, in the period from 2005 to 2012 were retained (Inclusion criteria). However, any HIV-positive patient under 16 years of age, female and male, or any untreated adult patient was not included (Exclusion criteria).

Treatment of patients

The selected patients received thirty-six (36) months of first-line antiretroviral treatment (seven therapeutic combinations). They were followed up in the laboratory for six months; every six months blood samples were taken for biological analysis.

Measurement of clinical parameters

Karnofsky index

The Karnofsky Index (KI) is an indicator of overall health status that is similar to a synthetic quality of life scale. On a scale of 0 (death) to 100% (complete autonomy), the KI measures the patient's functional dependence according to the assistance he or she needs for everyday activities (personal needs, dressing, etc.) and medical care. This parameter is determined by the CMSDS medical team.

Body Mass Index

The body mass index (BMI) is used to evaluate the risk of diseases related to overweight or underweight. It is calculated using the formula: $BMI = P(Kg)/T(m)^2$

Weight (P) and height (T) are measured at each patient visit to the CMSDS.

Brachial Perimeter

This is the circumference of the arm expressed in mm. It is measured on the left arm halfway between the tip of the elbow (olecranon) and the tip of the scapula (acromion). The arm must be relaxed.

Statistical analysis

Data processing was performed using Statistica version 10 software. Results were expressed as mean $\pm$ SD (standard deviation). Student's t-test was used to compare the means. The test was considered significant at a value of $P < 0.05$.

Results:-

Effect of ARVs on the Karnofsky Index (KI)

The Karnofsky Index reflects the patient's ability to be autonomous or not.

In all patients (**Fig1**), the Karnofsky Index remained constant around 100% from the initiation of treatment until the 36th month. The effect of the treatment is therefore reflected by the maintenance of the Karnofsky Index within the normal range.

All 7 combinations maintain this index at this value for the duration of the treatment (**Fig2**).

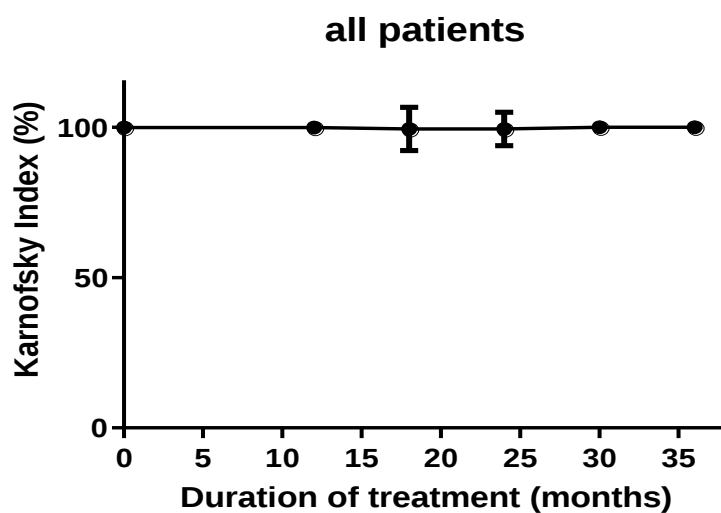
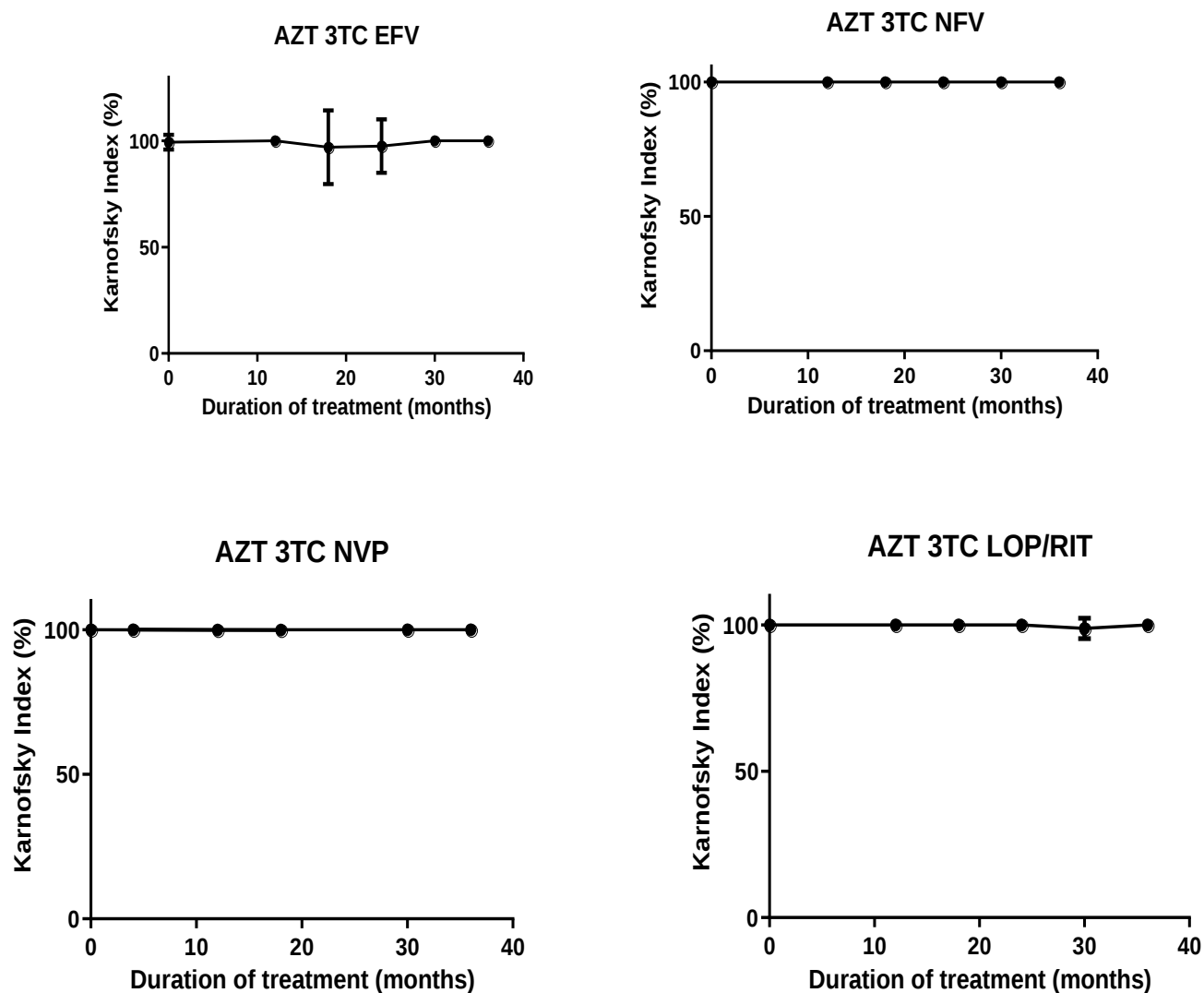


Fig 1:- Effect of treatments on Karnofsky Index in all patients.



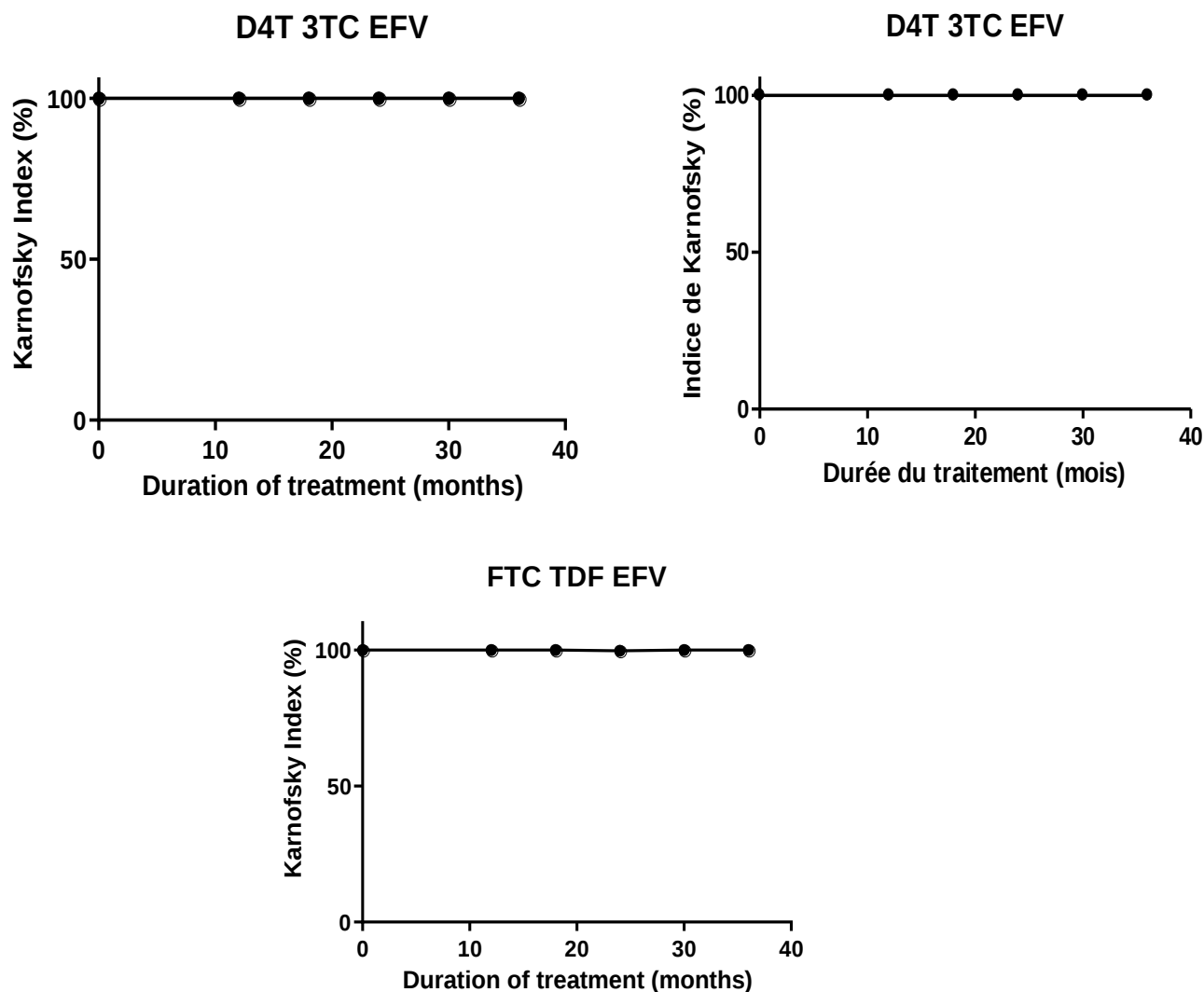


Fig 2:- Effects of combination therapies on the Karnofsky Index

Effect of ARVs on Body Mass Index (BMI)

The body mass index reflects the physical condition of an individual. The average value of this index in all the treated patients taken together evolves between 21 and 24kg/m² (Figure 3).

The different combinations of ARVs administered do not specifically influence the evolution of this index, which remains in this range until the 36th month of treatment (Fig 3)

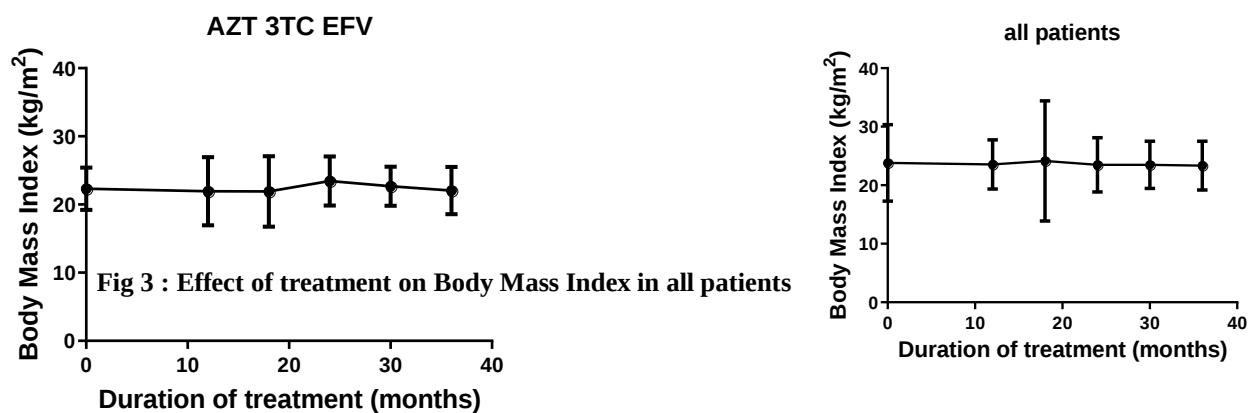


Fig 3 : Effect of treatment on Body Mass Index in all patients

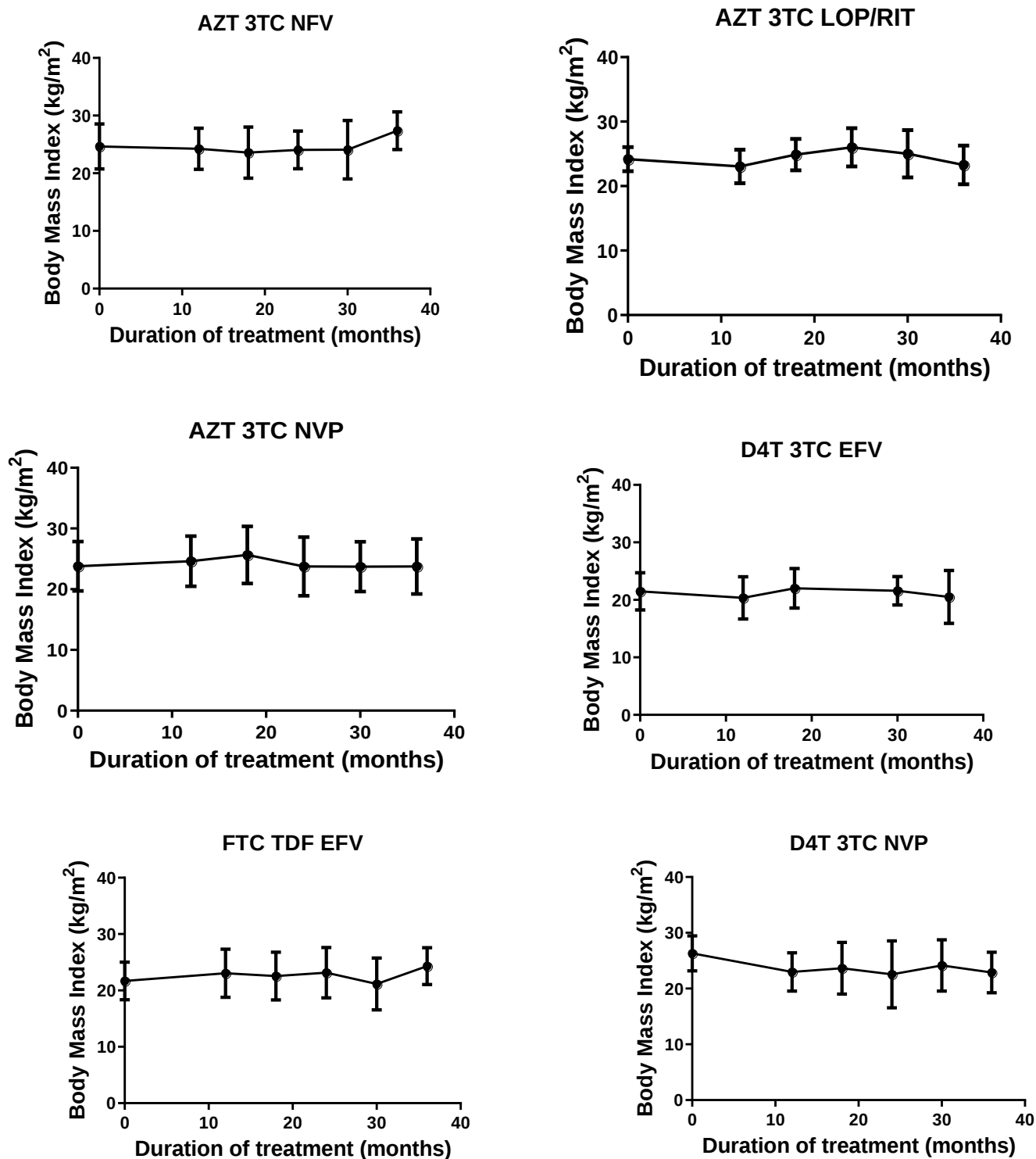


Fig 4:- Effects of combination therapies on Body Mass Index.

Effect of ARVs on Brachial Perimeter (BP)

Although usually used in children, the brachial perimeter is used to report the physical status of HIV positive patients. In all patients undergoing ARV treatment, the mean value of the Brachial Perimeter increases progressively and significantly ($P < 0.05$) over time during the treatment. This increase is 7.09% at M12; 15% at M18; 19.77% at M24; 50.99% at M30 and 50.35% at M36 (**Fig 5**).

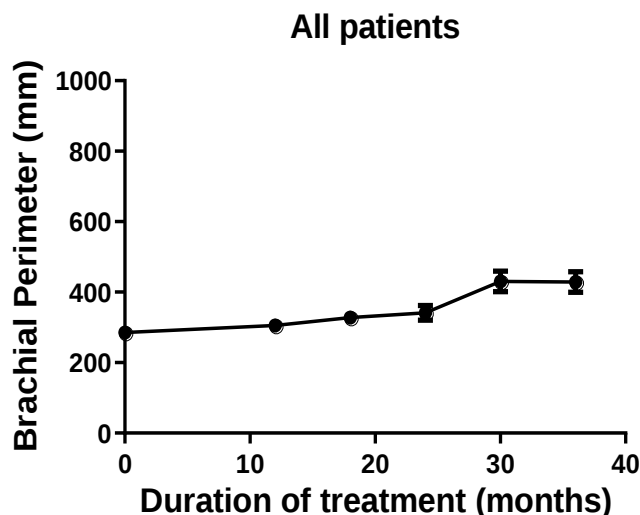


Fig 5:- Effects of treatments on the Brachial Perimeter of patients.

Taken in isolation, each combination also results in a progressive and significant ($P < 0.05$) increase in BP over time (Figure 6). These increases are respectively:

13.49%; 1.47%; 8.81%; 79.21% and 63.80% at M12, M18, M24, M30 and M36, for the AZT 3TC EFV combination;

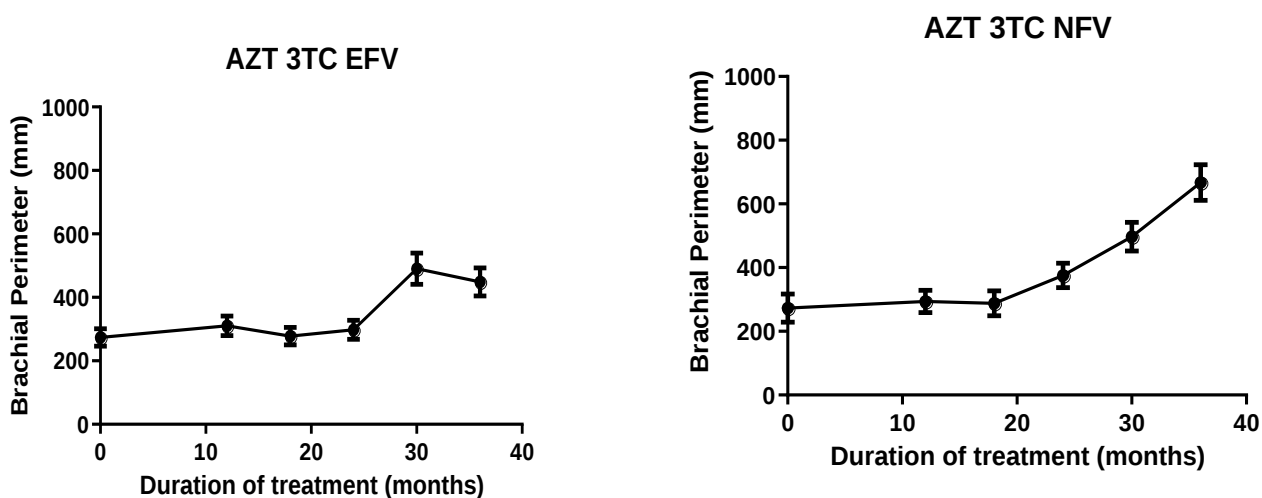
0.35%; 36.28%; 35.48%; 8.18% and 0.87% at M12, M18, M24, M30 and M36, for the AZT 3TC LOP/RIT combination;

7.73%; 5.58%; 37.75%; 82.30% and 144.73% at M12, M18, M24, M30 and M36, for the AZT 3TC NFV combination;

10.91%; 26.13%; 30.37%; 43.91% and 62.84% at M12, M18, M24, M30 and M36, for the combination AZT 3TC NVP;

6.41%; 2.64%; 1.13%; 56.15% and 35.32% at M12, M18, M24, M30 and M36, for the combination DT4 3TC EFV;

6.27%; 14.36%; 6.63%; 38.72% and 8.84% at M12, M18, M24, M30 and M36, for the DT4 3TC NVP combination;
15.79%; 18.76%; 17.37%; 55.86% and 8.87% at M12, M18, M24, M30 and M36, for the combination FTC TDF EFV.



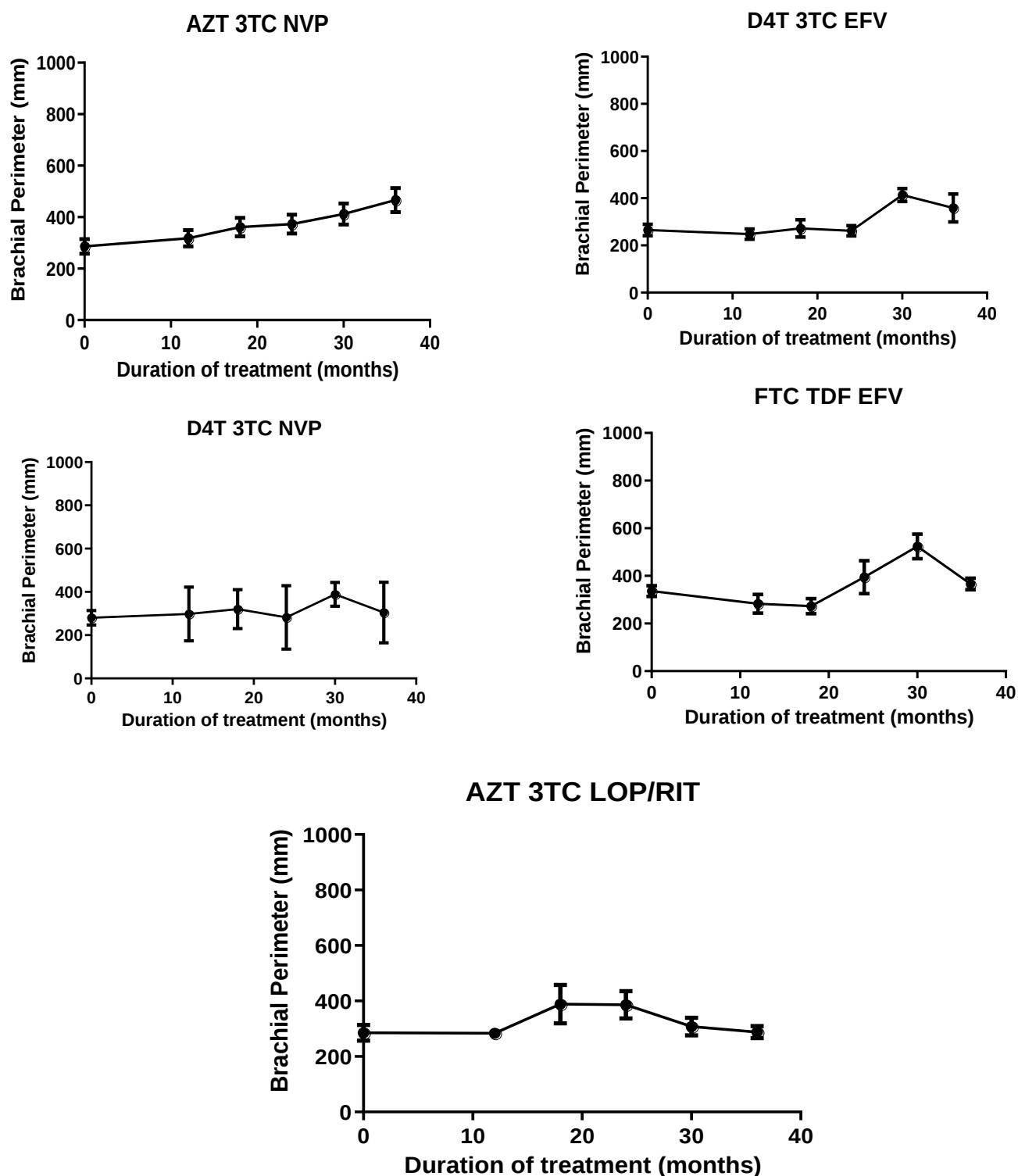


Fig 6:- Effects of combination therapies on Brachial Perimeter ** : $P < 0,01$; * : $P < 0,05$.

Discussion:-

In order to investigate the effects of ARV treatment on patients, a study was devoted to the clinical aspect of patients. This clinical aspect was assessed by measuring the Karnofsky Index (KI), Body Mass Index (BMI) and Brachial Perimeter (BP).

During the 36 months of the study, the KI remained almost unchanged. Thus, the average value of this index for all patients remained around 100% without significant change. The optimal level of IK shows that the patients have no signs of disease and can lead a normal life. It is a good clinical condition that reflects the absence of toxicity of vital organs.

BMI in diagnosis is a strong and independent predictor of survival of HIV-infected patients in West Africa. In the absence of sophisticated clinical and laboratory support, BMI could also play a role as a decision support indicator for when to initiate antiretroviral therapy (**Van der Sande MABand al, 2004**). Linear regression shows a weak, but high and significant correlation between the BMI baseline and the CD4+ baseline (**Van der Sande MABand al, 2004**). The BMI trend also shows that over the entire treatment period, patients maintained a good body weight according to WHO standards ($18.5 < \text{BMI} < 25$). The characteristic feature is that no weight loss was observed. This is important because weight loss continues to plague some people with HIV. Studies have shown that even small amounts of unintended weight loss can increase the risk of illness and death. People living with HIV are often at risk of "wasting syndrome," which is defined as a loss of more than 10% of body weight. Whenever weight loss occurs, some of the weight lost comes from stored fat reserves and some from lean tissue. The proportions depend on the underlying cause of the weight loss. The causes are complex and still largely unknown. In addition to physical factors, social, economic, mental and emotional factors may be involved. When HIV is present, low caloric intake is usually the primary driver of weight loss. This is because when the body is infected with HIV, the immune and defense system is even more stressed to fight the infection. This increases the need for energy and nutrients. Additional infection and fever increase the body's demand for food.

In addition, HIV-positive people do not eat enough because the disease and medications can decrease appetite, change the taste of food and prevent it from being absorbed by the body (**FAO, 2014**). For this reason, when weight loss occurs, the main treatment strategy is to prescribe a high-calorie, high-protein diet and a multivitamin with minerals to increase micronutrient intake to the level necessary to promote weight gain. In view of these factors, one could assume that far from being attributable to a direct effect of ARVs, the weight balance of the patients is the result of a good socio-emotional balance, accompanied by a good tolerance of the drugs, which did not cause any symptoms or side effects that would make the act of eating (the main sources of energy are food) difficult. This hypothesis is justified by the satisfactory evolution of the Brachial Perimeter, which confirms an absence of thinness and malnutrition in the patients. BMI and BP therefore show a good nutritional status of patients under ARV treatment. These treatments, whatever the therapeutic combination, allow maintaining a good nutritional status.

In contrast to our study, an American research on 363 patients from two Navy medical cohorts (**Crum-Cianflone NF and al, 1992**), showed a generalization of overweight problems in HIV-positive patients: 63% were overweight, 46% were overweight ($25 < \text{BMI} < 29.5$) and 17% were obese ($\text{BMI} \geq 30$). This study shows that even among reported AIDS patients, 29% are overweight or obese. While not correlating with ARV use, the research suggests two possible explanations for this finding. On the one hand, since wasting is usually associated with HIV, wanting and ensuring weight gain is a way for many patients to protect themselves from stigma and exclusion. On the other hand, HIV-positive subjects would be in line with the general population in the United States who naturally gain weight.

Conclusion:-

In total, it can be said that the evolution of these three parameters (IK, BMI and PB) is a good indicator of the effectiveness of the treatments, as they allow the patients to maintain a good clinical state.

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