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Is the strategy of Biological Passport changing the behaviour of elite athletes in Portugal?

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Abstract

Athlete Biological Passport (ABP) is considered an excellent tool to target athlete with conventional anti-doping tests to define Anti-Doping Rule Violations (ADRV) [2]. For that reason it is important to understand tendencies on the behaviour of athletes and also to understand if the aim of anti-doping related with ABP strategy is being achieved. More and more athletes are using their ABP profiles to demonstrate to Teams and Contractors that are Clean Athletes, which represents a crucial, but less divulgated objective. Five years after Lisbon Anti-doping Laboratory's accreditation for ABP (haematological module) it is interesting to look at those past 5 years and compare RET% results from Athletics and Cycling athletes and also to perform a monthly analysis to verify if there are periods of the year more favourable to doping practices by athletes. A possible trend, although not statistically significant, on the reduction of percentage of abnormal Reticulocytes results has been seen on both sports, especially for Athletics, nearly two years after ABP methodology was implemented in our laboratory. The results demonstrate also the importance to test during the holidays period (October and November) and during preparation phases (January and March). For Athletics, June, July and August probably represent strategic periods for perform controls. The months of July and August represent very important months, where usually the most important Track and Field Events happen. For Cross Country and Walking athletes January seems to be also a crucial month to test.

Introduction

Lisbon Anti-Doping Laboratory is accredited for Biological Passport (ABP), haematological module, since 2010. ADoP (Autoridade Antidopagem de Portugal) was one of the NADO's with the highest number of samples collected on Athletics and Cycling [1] and a picture of what is happening in Portugal reveals interesting information. Once Reticulocytes (RET%) is one of the most reliable marker of blood doping, a review of national athletes, according to Zorzoli's Reticulocyte classification [2], is presented here.

The aim of this study was to compare RET% results from Athletics and Cycling athletes between 2010-2014 to understand if there is a decrease of abnormal results over five years.

A monthly analysis was also made to verify if there are periods of the year more favorable to doping practices.

Experimental

1281 OOC blood samples analysis, performed on Sysmex XT-2000i, collected by ADoP for ABP methodology, of which:

- 2010 - 35 samples from Athletics and 112 from Cycling
- 2011 - 123 samples from Athletics and 134 from Cycling
- 2012 - 138 samples from Athletics and 161 from Cycling
- 2013 - 128 samples from Athletics and 285 from Cycling
- 2014 - 54 samples from Athletics and 111 from Cycling

RET% values were separated in three different categories, according to Zorzoli's classification [2]:

- $RET\% \leq 0.40\%$ - OFF phase
- $0.40\% < RET\% < 2.00\%$ - normal range
- $RET\% \geq 2.00\%$ - ON phase

Data analysis was performed by Fisher's exact probability test (statistical differences were accepted for p-values<0.05)

Results and Discussion

In total, 47 results (4%) in the extreme ranges were identified, wherein 28 results (60%) refer to Cycling and 19 (40%) to Athletics.

For Cycling, a fluctuation on abnormal RET% results can be seen. With the exception of the year 2013, a decrease tendency is shown for RET% values, especially for values above 2.00% (Figure 1).

For Athletics, since 2012, RET% values under 0.40% disappeared and for those above 2.00% there has been a downward trend (Figure 2). The highest value of abnormal results in 2012 can eventually be explained by the pressure to increase athletes performance caused by the London Olympic Games.

On both sports (Figure 3) an almost constant percentage (around 4%) from 2010 to 2013 had abnormal RET% results and a decrease to 1.8% can be seen in the year of 2014.

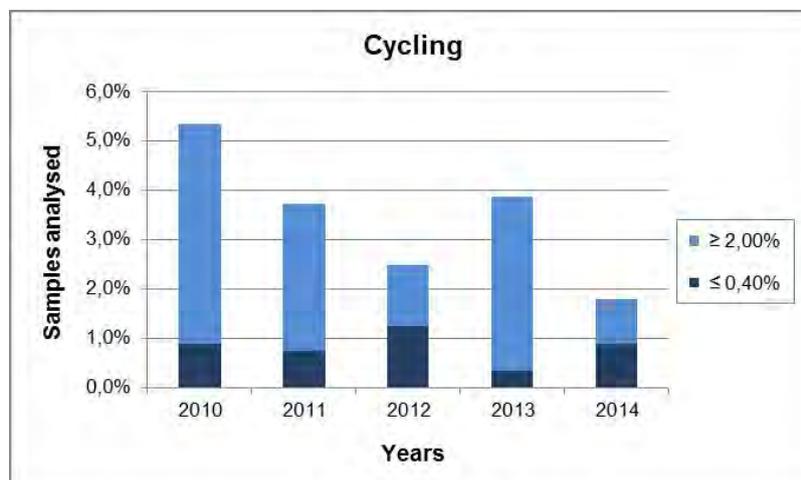


Figure 1. Changes in abnormal RET% values from 2010 to 2014 for Cycling (y=percentage of samples analyzed with abnormal RET% results).

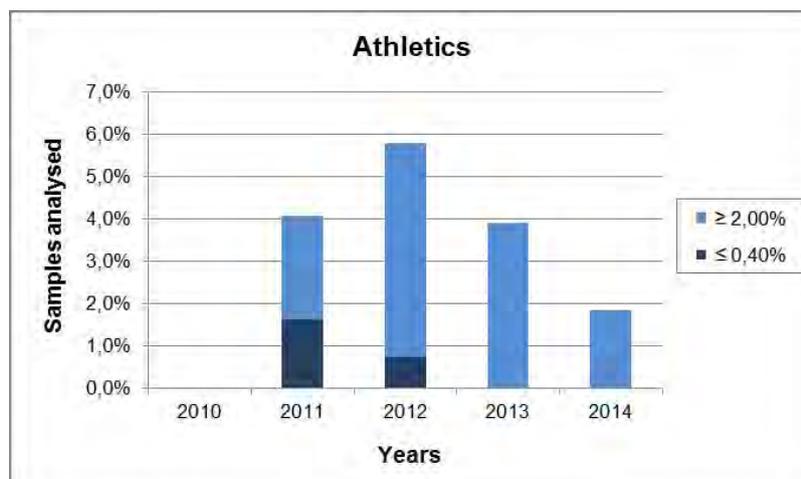


Figure 2. Changes in abnormal RET% values from 2010 to 2014 for Athletics (y=percentage of samples analyzed with abnormal RET% results).

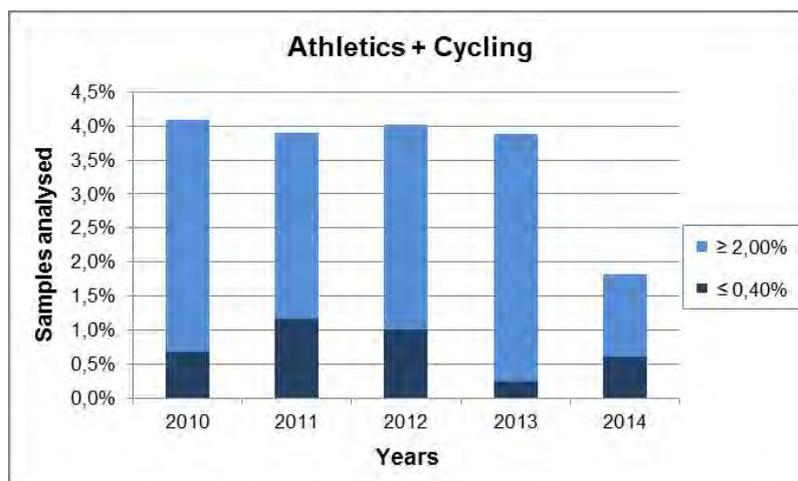


Figure 3. Changes in abnormal RET% values from 2010 to 2014 for both sports (y=percentage of samples analyzed with abnormal RET% results).

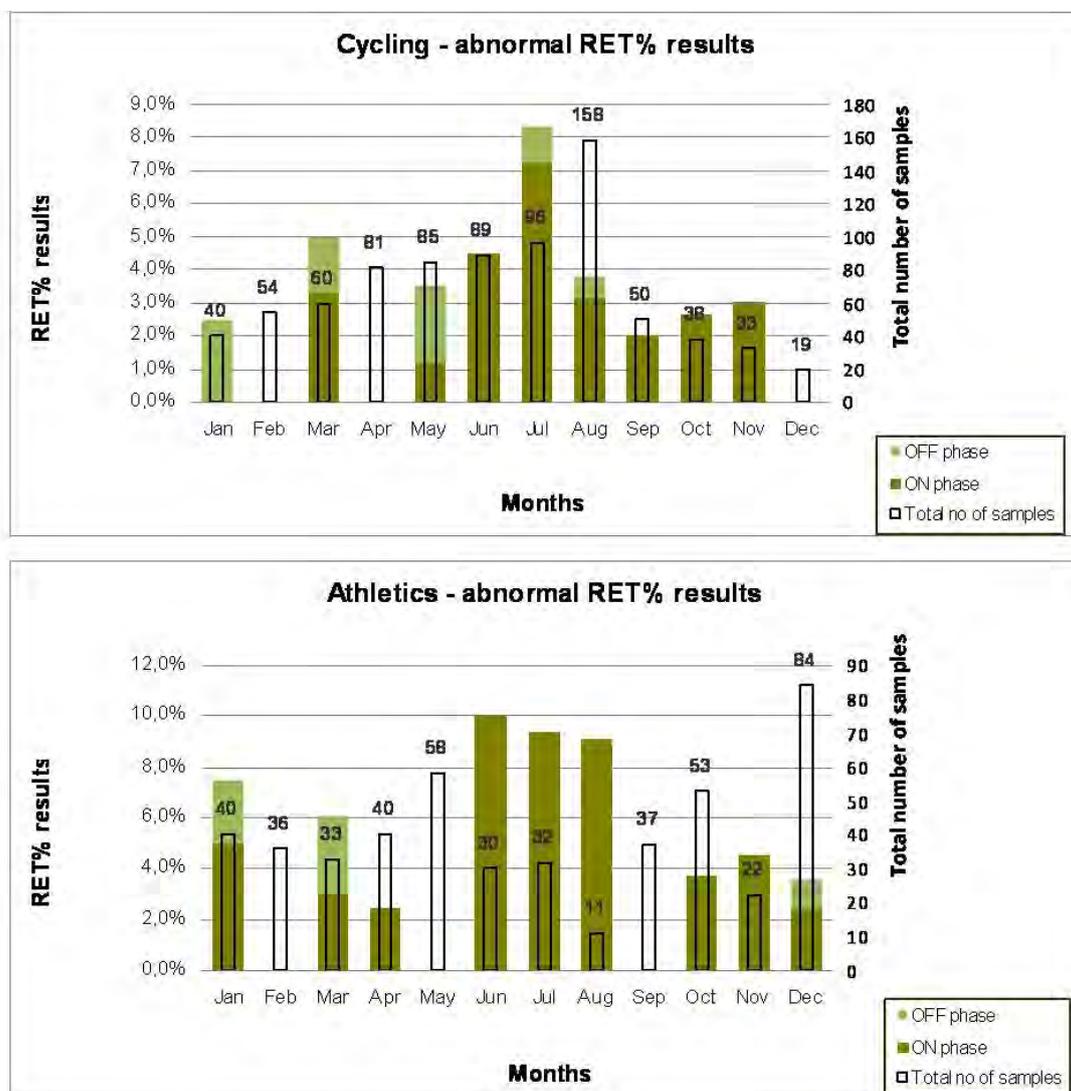


Figure 4. Compilation of abnormal RET% results for the 12 months of the 5 year study on Cycling and Athletics (y=total number of samples and percentage of samples analyzed per month over the 5 years with abnormal RET% results).

Within the abnormal results obtained, our laboratory reported more for ON phase (83.3%-Athletics and 79.3%-Cycling), than for OFF phase (16.7%-Athletics and 20.7%-Cycling). To realize if there were significant differences between months that expressed abnormal RET% results, an analysis was made for both sports (Figure 4). July seems to be a strategic month to perform controls especially on Cycling and, since August is traditionally the month of the Portuguese Tour, July is the month where RET% results above 2.00% are more frequent. The importance to test during holiday's period (October and November) and preparation phases (January and March) has been seen. June, July and August, for Athletics, represent 9% to 10% of abnormal RET% results for boosting period - ON phase, showing that those are probably strategic periods for perform controls. July and August represent important months, where the most important Track and Field Events happen. January seems to be a crucial month to test for Cross Country and Walking athletes, before important Events.

Conclusions

In this study there is a possible trend, although not statistically significant, on the reduction of percentage of abnormal Reticulocytes results. This happens in both sports two years after ABP methodology was implemented in our laboratory and, especially for Athletics, where we observed that tendency after year 2012.

This study can be of interest for people involved in sport (Laboratories, NADO's) demonstrating the usefulness paper this ABP methodology can have as a Deterrence tool and in the protection of Athletes' Health. It would be interesting to keep this monitoring ongoing in order to check if the downward trend observed can be confirmed.

References

- [1] WADA Anti-Doping Testing Figures (2012-2013) - Athlete Biological Passport (ABP) Report-Blood Analysis
- [2] Mario Zorzoli. Biological passport parameters. J.Hum. Sport Exerc. Vol 6, nº2, 2011