The effects of diphtheria-tetanus-pertussis booster vaccine on soluble urokinase-type plasminogen activator receptor (suPAR) in plasma.

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Background

Studies have shown that vaccines may have non-specific effects on mortality, ie. effects which cannot be explained merely by prevention of the targeted disease. Worryingly, several observational studies have suggested that receiving diphtheria-tetanus-pertussis (DTP) vaccine is associated with increased mortality in areas with herd immunity to pertussis. This has been most pronounced in girls. The immunological mechanisms behind the non-specific effects are unknown.

Aim

Within a randomised trial of receiving or not receiving DTP booster vaccine together with oral polio vaccine (OPV) at 18 months of age, we aimed to study the effect of DTP vaccine on the level of suPAR (soluble urokinase Plasminogen Activator Receptor) in the blood. The suPAR levels reflect the level of immune-activation. We hypothesized that receiving DTP vaccine would be associated with increased suPAR levels, in particular in girls.

Methods

At the Bandim Health Project in Guinea-Bissau 6000 children were randomised to receive either DTP and OPV or just OPV at age 18 months. A subgroup had blood drawn at enrolment and 6 weeks after vaccination. suPAR levels in plasma were assessed using a double-sandwich ELISA. Data was analyzed in regression models using Stata. All analyses were stratified by sex.

Results

We obtained 356 paired samples, equally distributed in the different vaccination groups, and according to sex. The median suPAR-level at inclusion was 3.8 (inter quartile range (iqr) 2.7-4.9). At follow up, the median suPAR-level was 3.8 (iqr 2.7-4.9). The levels were higher than those seen in adults. There was no association between DTP and change from baseline to follow-up overall or in either sex. The level at 6 weeks was strongly correlated with the level at inclusion (r2=…).

Conclusion

This study is the first to study suPAR levels in children. The suPAR levels were high and very constant with limited intrapersonal variation over time. Vaccination with DTP and OPV compared with OPV only was not associated with any change in the suPAR levels.