In this study, we explore whether dynamic changes in Haemoglobin (Hb) levels is associated with treatment response and progression of renal cell carcinoma (mRCC) 

- Immune checkpoint inhibitors (ICI) and VEGF inhibitors (VEGFI) alone or in combination have become established treatments for metastatic renal cell carcinoma (mRCC)
- However, early clinical biomarkers of response are limited
- Recent studies have suggested that blood test parameters such as neutrophil to lymphocyte ratio, neutrophil to lymphocyte ratio1,2,3 or CRP4 may be of prognostic significance

In this study, we explore whether dynamic changes in Haemoglobin (Hb) levels is associated with treatment response and progression

Methods

- We conducted a retrospective analysis in the context of an audit of 276 patients treated between January 2014 and July 2021 across three tertiary centres in the United Kingdom and Netherlands: (1) Barts Cancer Institute, London (2) Beatson West of Scotland Cancer Centre, Glasgow and (3) Netherlands Cancer Institute, Amsterdam.
- Hb levels at baseline, 6 and 12 weeks after commencing treatment, and at disease progression or death were collected
- First radiological disease assessment occurred at 12 weeks. Patients were classified based on this as either Responders (partial or complete) or Non-responders (stable or progressive disease)
- 35 patients were excluded from analysis due to receiving a blood transfusion within 12 weeks of treatment (n = 16), insufficient or missing data (n = 16) and outlier values (n = 3)
- Patients were grouped according to first-line treatment with ICIs alone (n = 90), combination ICI/VEGFI (n = 97) or VEGFI alone (n = 54) (Table 1).
- A mixed ANOVA model was used to assess the combined effect of time and treatment response on the variance of Hb. Significant mixed or individual effects were followed up with one-way ANOVA and pairwise tests.
- The Kaplan-Meier method, Log rank test and Cox proportional hazards model were used to analyse survival data.

Results

- ICI-only responders (n = 58) had a higher baseline Hb than non-responders (n = 32), p = 0.08. This intergroup difference increased significantly at week 6 (p = 0.01) and 12 (p = 0.01) (Fig. 1A), due to responders experiencing an increase in Hb at 12 weeks (n = 58, 6.58 ± 12.7, p = 0.02) (Fig. 1B)
- Combination ICI/VEGFI responders (n = 55) also demonstrated a significant increase in Hb at 12 weeks (14.6 ± 17.8, p = 5x10^-10), a trend which was less marked in non-responders (n = 42, 5.66 ± 14.5, p = 0.04) (Fig. 2B).
- VEGFI-only responders (n = 17) had a higher Hb at all three timepoints (p = 0.01, 0.04 and 0.003 respectively) (Fig. 3A), Non-responders (n = 37) showed a significant reduction in Hb at week 12 (-6.75 ± 14.4, p = 0.03), a trend which was non-significant amongst responders (-6.24 ± 11.4, p = 0.1) (Fig. 3B).
- Amongst patients receiving ICIs alone, an increase in Hb at time of disease progression or death (n = 12) was positively prognostic compared to a decrease in Hb (n = 46) (Median PFS 10.4 vs 2.6 months, p = 0.02). This survival advantage remained significant on cox regression analysis for age, sex and performance status (p = 0.02) (Fig. 4).
DECLARATION OF INTERESTS

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Please state your disclosures here
The author has no disclosures to state.