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Title: Diagnostic delay in AYA Non-Hodgkin Lymphoma patients. Does it exist? A comparative analysis across all ages.

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Introduction: Non-Hodgkin lymphoma (NHL) is a type of cancer that affects B and T lymphocytes which are important for immune function. NHL is divided into many subtypes.

Past research has demonstrated that a diagnostic delay exists for adolescent and young adult (AYA) oncology patients. Additional studies have also demonstrated mixed associations between this diagnostic delay and poorer outcomes of AYA oncology patients dependent on variables including tumour type. A previous summer studentship demonstrated diagnostic delay in AYA sarcoma patients compared to adult and paediatric patients due to a number of contributing factors.

Aim: To characterise the patient delay, the referral delay, the oncologist or hematologist delay and the total symptom interval of NHL patients from paediatric, AYA and adult patient groups. To identify any additional factors that may contribute to diagnostic delay intervals.

Impact: This study has found a difference in the median symptom intervals of paediatric, AYA and adult NHL patients. Adult NHL patients showed the greatest patient delay, referral delay and total symptom interval. NHL subtypes also differed between age groups. This will lead to further investigation of the underlying causes of diagnostic delay and its subsequent impact on patient outcomes. Additionally, the importance of cancer awareness for both patients and health professionals is highlighted.

Method: The online and hard copy patient files of Southern District Health Board and Canterbury District Health Board NHL patients from paediatric (0-14 years) (n = 24), AYA (15-24 years) (n = 21) and adult (25+ years) (n = 20) age groups were collected and analysed. Age groups were classified by patient age at diagnosis. Analysis of files determined:

- Patient delay: Time from appearance of first symptoms to first presentation at a health care provider (HCP).
- Referral delay: Time from first presentation at health care provider to first specialist appointment with a hematologist or oncologist with the suspicion of cancer.
- Haematologist/oncologist delay: Time from first specialist appointment to receipt of first treatment.
- Total symptom interval (TSI): the combined total of the patient, referral and haematologist/oncologist delays.

Multiple additional variables were recorded including NHL type and first HCP. Patients with low grade NHL were excluded from the study.

Results: This retrospective study demonstrated a relationship between patient age and TSI. Adults showed the longest median TSI of 93.5 days whereas paediatric and AYA patients showed a median TSI of 37.5 and 52 days respectively.

Individual delay intervals contributing to the total TSI also differed between age groups. The median patient (42 days) and referral delays (40.5 days) for adults were greater than the median patient delay and referral delay for both paediatric patients (30 and 3.5 days, respectively) and AYA patients (30 and 17 days, respectively). Both paediatric and AYA patients showed the same patient delay (30 days) however the referral delay was greater for AYA patients (17 days) than for paediatric patients (3.5 days). Adult patients also showed the greatest haematologist/oncologist delay (11 days) versus AYA (5 days) and paediatric patients (4 days).

The median TSI across all age groups for other variables was also analysed. The median TSI for first HCP visit was longest for a GP visit (85 days), followed by a hospital/other visit (50 days) and lastly an ED visit (36 days). The median TSI for each NHL subtype was longest for mantle cell lymphoma (228 days), followed by peripheral T cell lymphoma (95 days), other lymphoma (91 days), diffuse large B cell lymphoma (DLBCL) (89.5 days), precursor T-lymphoblastic lymphoma (50 days) and Burkitt's lymphoma (30.5 days). NHL subtype also differed between age groups. Most adult NHL patients had a DLBCL whereas the majority of paediatric and AYA NHL patients were diagnosed with a Burkitt's lymphoma.

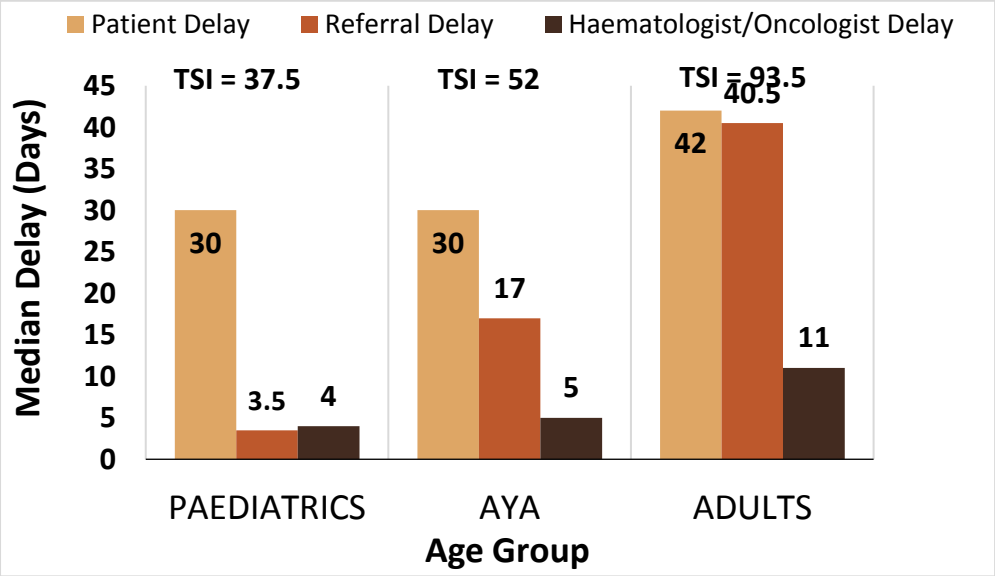

Figure 1: Median intervals from first symptoms in paediatric, AYA and adult age groups.

Conclusion: Our results did not appear to show a diagnostic delay in AYA NHL patients. Instead, adult NHL patients showed the greatest median TSI with a high patient and referral delay. A potential diagnostic delay in adults may be due to the differing compositions of NHL subtypes in each age group. DLBCL is an intermediate grade lymphoma and was more common in adults versus Burkitt's lymphoma, a high grade lymphoma more common in paediatric and AYA patients, which may explain the longer adult TSI. A GP delay and the processing of referrals may possibly be contributing to the increased referral delay for adults, which the less aggressive DLBCL also permits. Conversely, paediatric patients, which account for ~1% of the NZ oncology population, are admitted immediately as inpatients upon suspicion of cancer.

Barriers to this studentship included the limited access to information such as GP records. Medical records occasionally contained missing or contradictory information. The study was also limited by a small sample size and a nationwide study should be considered. Recall bias may be present in patient delay intervals. Although low grade lymphomas were excluded, NHL subtypes also varied developmentally and biologically.