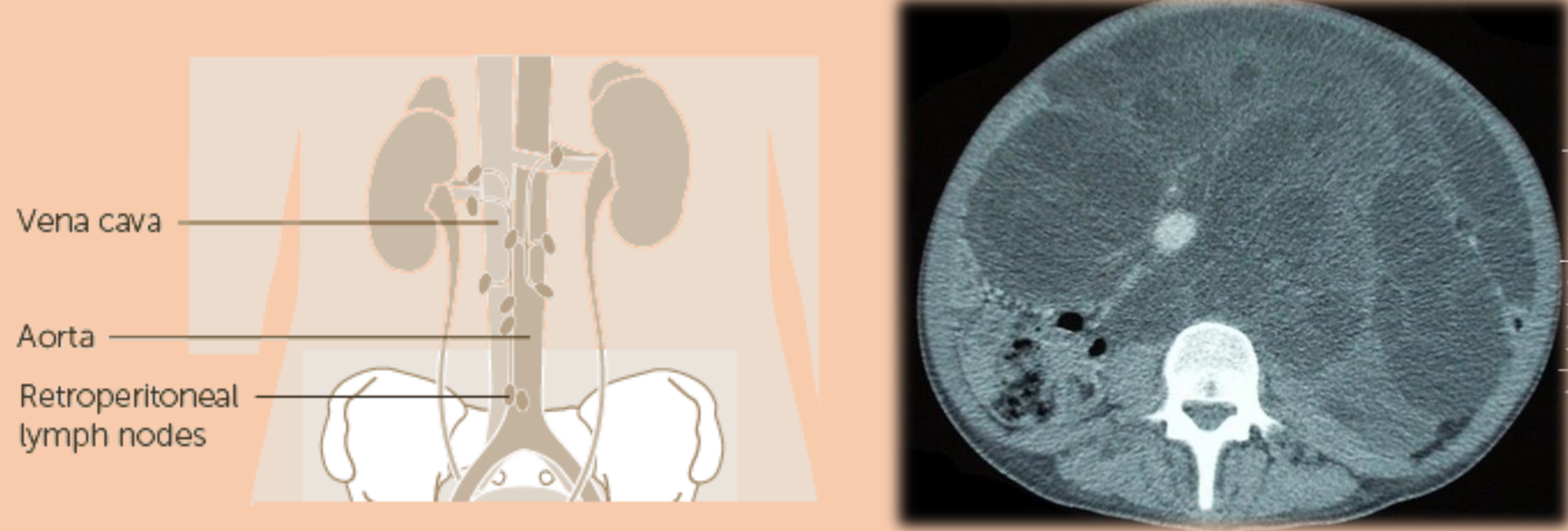


B. Wilson, D. Hendry, A. Zreik,
K. Smith, J. White, L. Mukherjee



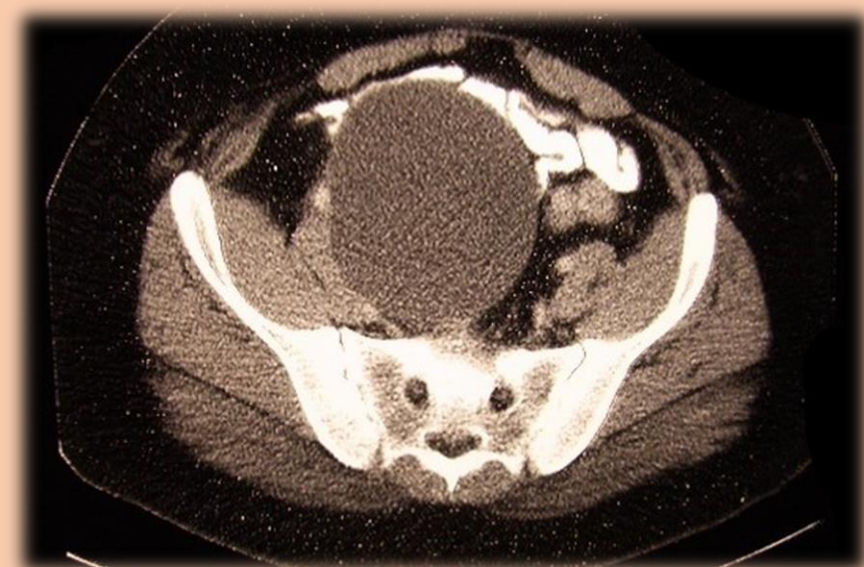
Introduction

Retroperitoneal lymph node dissection (RPLND) is a surgical intervention employed in the management of residual masses following chemotherapy for testicular germ cell tumours. Although the measurement of serum tumour markers **plays** a key role in the diagnosis, staging, and management of testicular cancer¹, they have limited utility in detecting teratoma² These are the most common type of recurrence post-RPLND, which tend to be serum tumour marker negative and may present with cystic components. However, the composition of this cystic fluid is not well-understood, with the largest case series containing only 11 patients.³

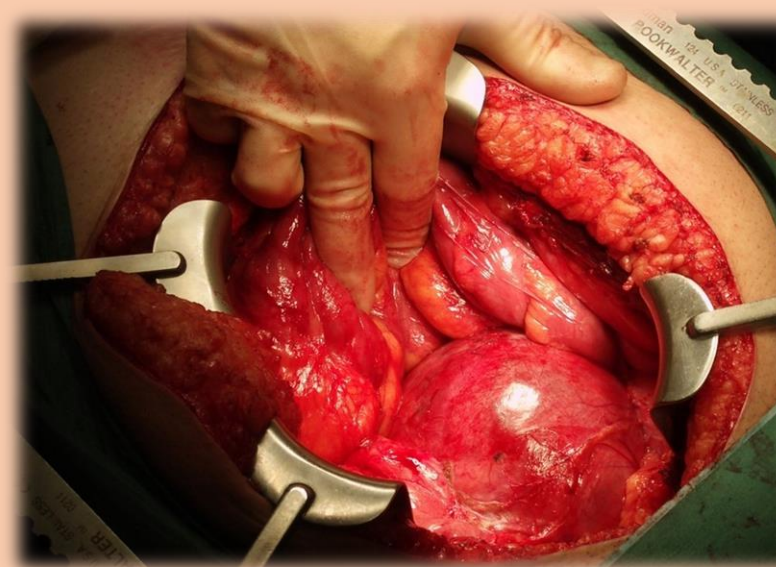


CT demonstrating extensive cystic teratoma

Lymphoceles are a recognized complication of RPLND, with an incidence of up to 15%.⁴ Differentiating between lymphoceles and cystic recurrences can be challenging, with serum tumour markers or radiological appearance alone being unreliable. To address this issue, this study aims to characterize the fluid of cystic masses encountered during RPLND. We hope that this information will prove useful in distinguishing between cystic recurrence and lymphocele post-RPLND, thereby improving the management of testicular germ cell tumours.



CT demonstrating cystic teratoma recurrence



Intraoperative photograph of The same cystic recurrence



Objectives

The **primary objective** of this study was to measure the levels of tumour markers (AFP, HCG and LDH) in cystic fluid aspirated during RPLND.

The **secondary objective** was to investigate the potential of using this information to differentiate between lymphocele and cystic recurrence. This study aimed to provide a foundation for further research with the potential to establish a clinical tool to differentiate between lymphocele and cystic recurrence.



Methods

Study design: This prospective study was conducted at the Scottish National RPLND service between May 2018 and December 2022.

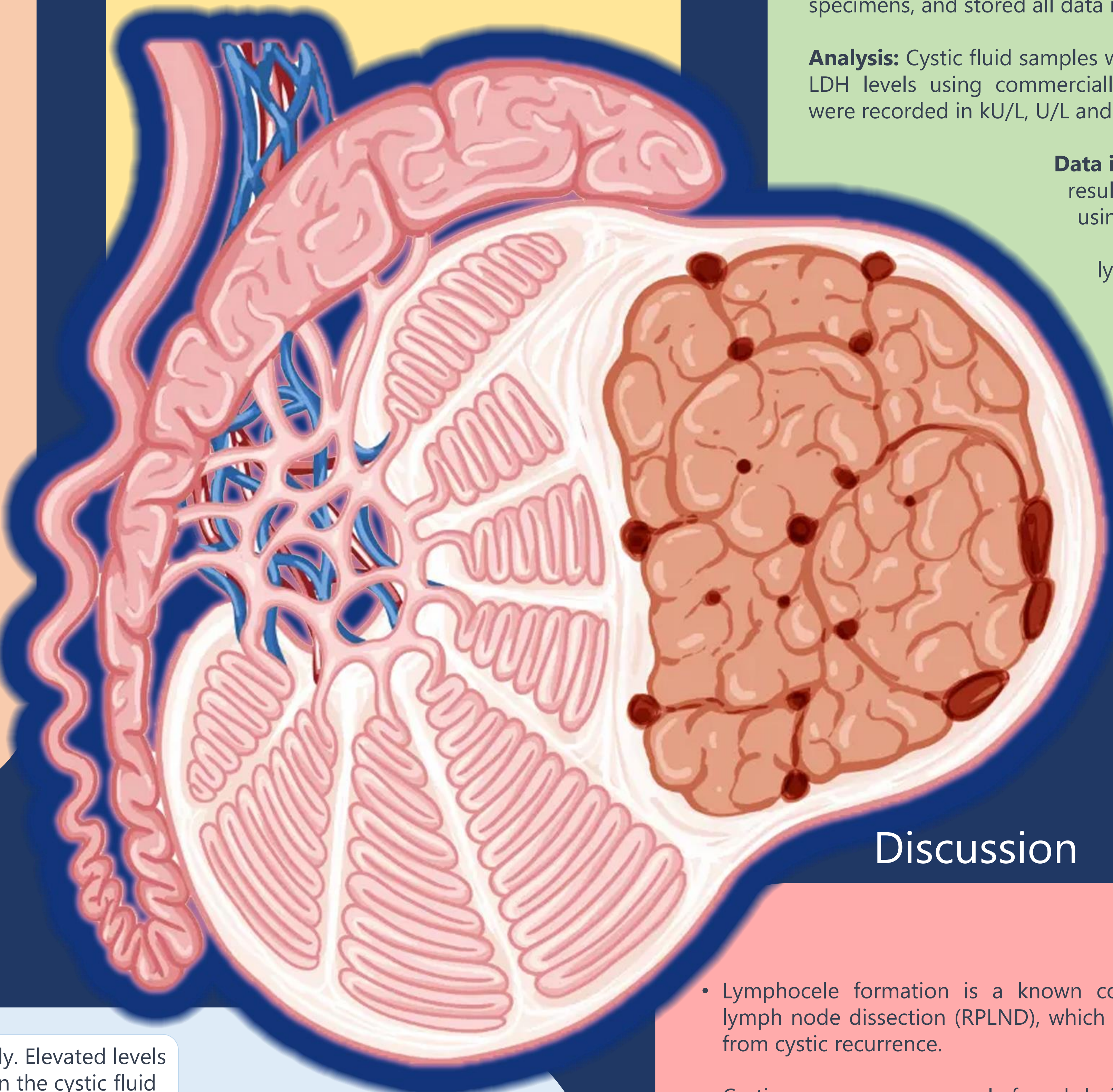
Participants: We included 23 consecutive RPLND patients with cystic components in their residual mass.

Data collection: Cystic fluid samples were obtained during RPLND, and serum tumour marker levels were collected at diagnosis and after chemotherapy. We also collected histopathological data for the initial tumour and RPLND specimens, and stored all data in a secure database.

Analysis: Cystic fluid samples were analysed for AFP, HCG, and LDH levels using commercially available assays. The results were recorded in kU/L, U/L and U/L respectively.

Data interpretation: We analysed the results to investigate the potential of using tumour marker levels in cystic fluid to differentiate between lymphocele and cystic recurrence.

Statistical analysis: We used appropriate statistical tests, including ANOVA and Pearson's correlation coefficient, with a P-value of less than 0.05 considered statistically significant



Discussion



- Lymphocele formation is a known complication of retroperitoneal lymph node dissection (RPLND), which can be difficult to differentiate from cystic recurrence.
- Cystic masses are commonly found during RPLND, but there is limited information available regarding the composition of the cystic fluid.
- Our findings are in line with the previously published data¹.
- Of the patients included in our study, 95.6% (22/23) were found to have teratoma on histological examination of resected RPLND specimens, irrespective of initial tumour type. The remaining patient did not have any malignant disease.
- Among the 22 patients with malignant disease, 20 (90.9%) had at least one elevated tumour marker in their cystic aspirate analysis.
- There was no association found between either the testicular tumour type or serum tumour marker levels at diagnosis and the degree of raised tumour markers in cystic fluid. This suggests that measuring tumour markers in post-operative cystic collections could be a feasible and minimally invasive method for distinguishing between lymphocele and cystic recurrence post-RPLND.

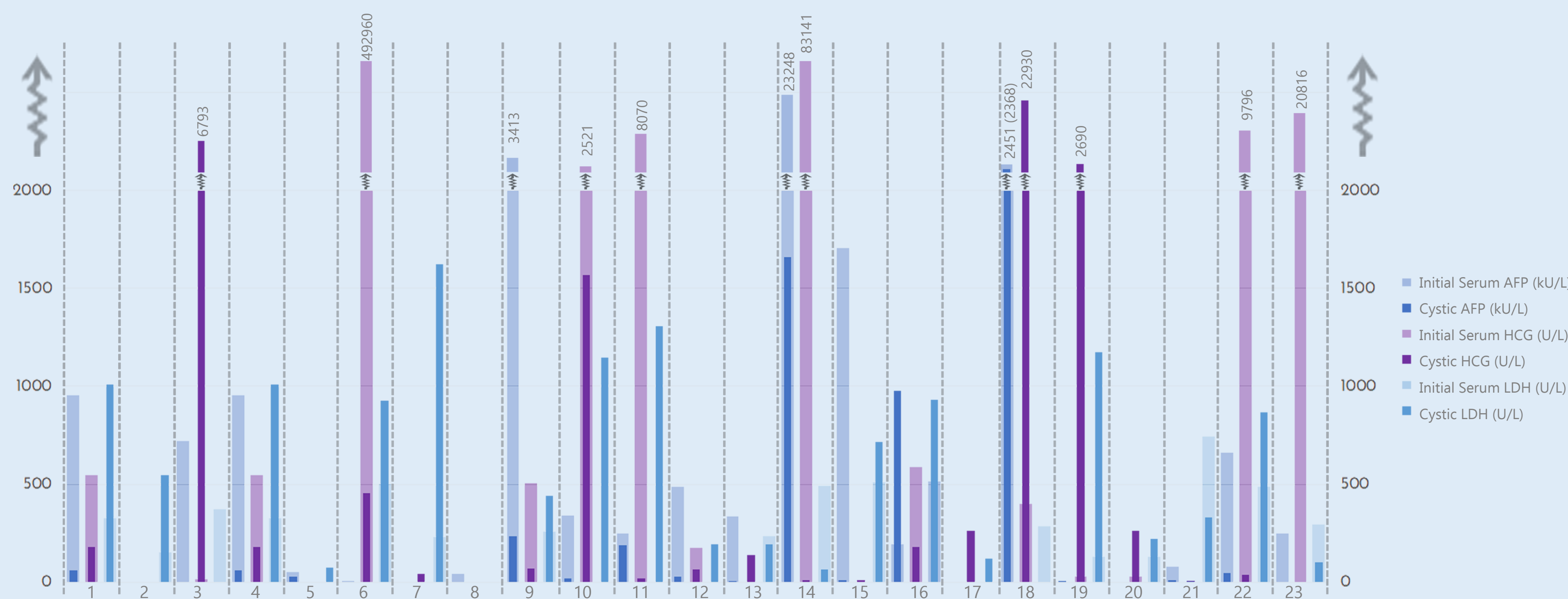
Key Points

- To our knowledge this is the largest study measuring tumour markers aspirated from cystic fluid during RPLND.
- The results of this study show that cystic fluid aspirated during RPLND from teratoma contains elevated levels of HCG, AFP, and LDH to varying degrees, independent of initial tumour type or serum tumour markers at initial diagnosis
- Future research can build on these findings to establish a clinical tool for differentiating between lymphocele and cystic recurrence post-RPLND, which could have significant implications for patient management and treatment outcomes.



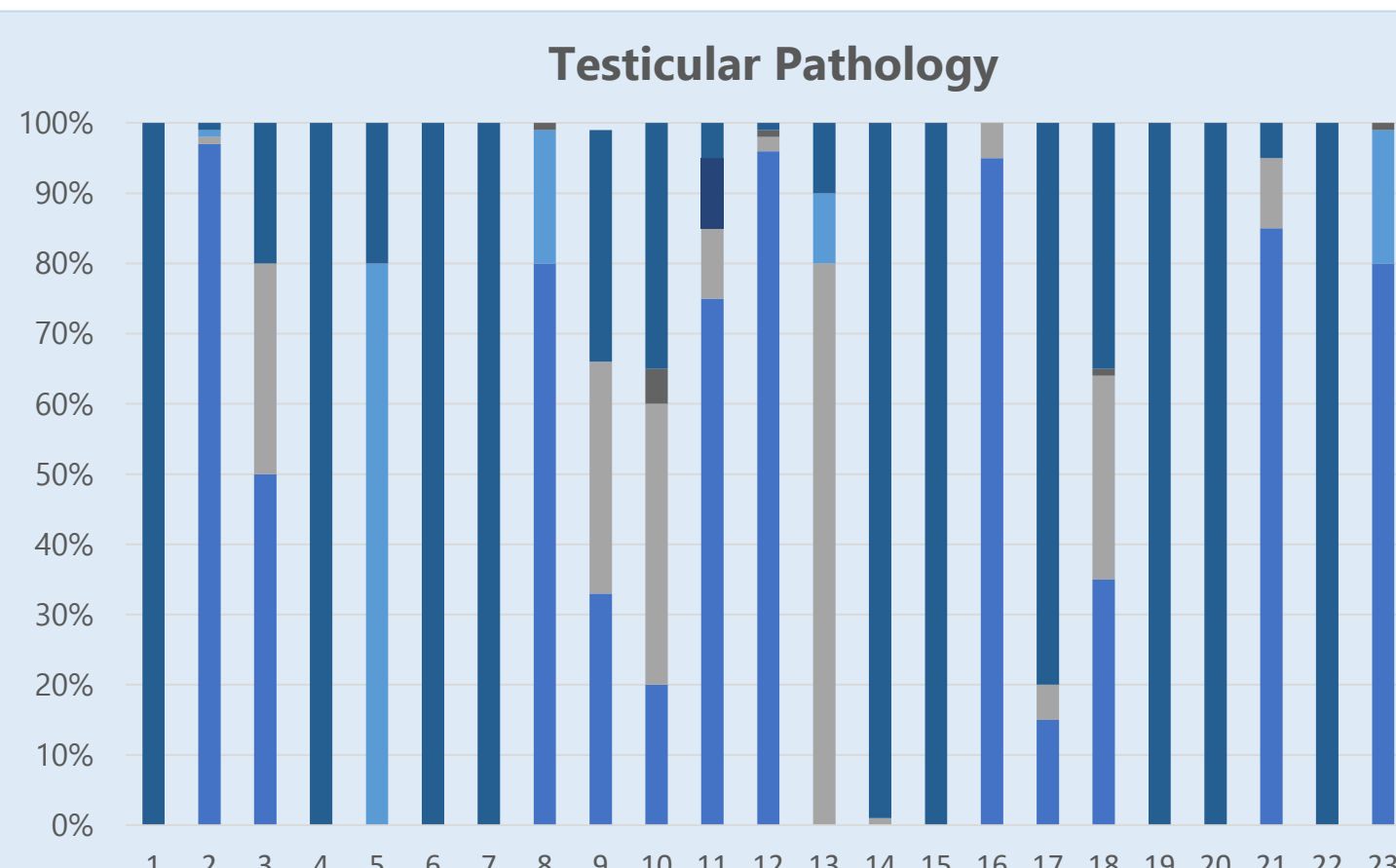
Results

23 patients were enrolled in the study. Elevated levels of tumour markers were observed in the cystic fluid aspirated from 21 out of the 23 patients.

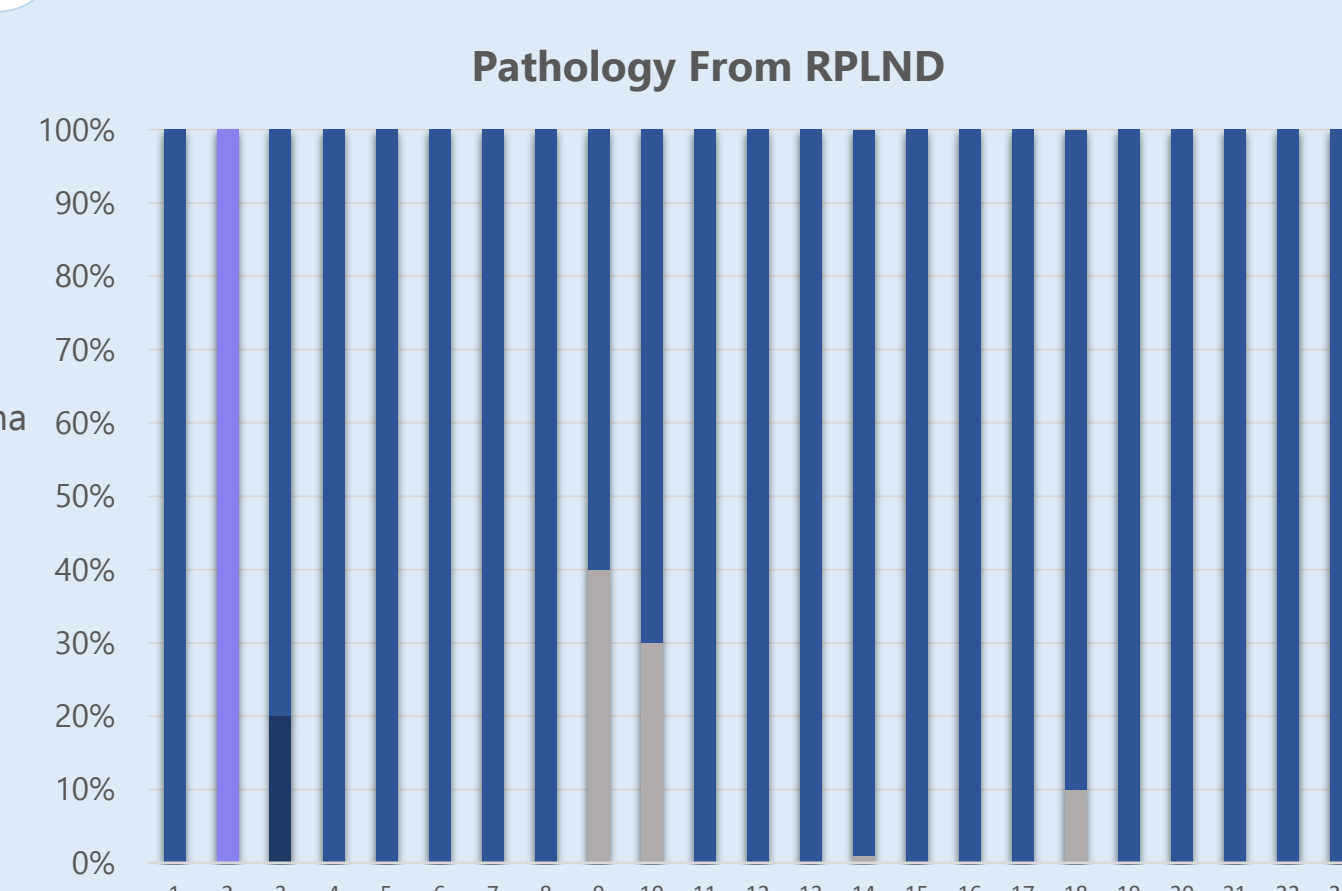


The levels of tumour markers in the cystic fluid varied widely between patients. AFP levels ranged from 12-2368kU/L, HCG levels ranged from 12-22930mU/L, and LDH levels ranged from 330-1624 U/L

Cystic tumour marker levels were independent of serum tumour marker at diagnosis.
(Pearson's Correlation: AFP p=0.95, HCG p=0.701, LDH p=0.69)



The levels of tumour markers in the cystic fluid were independent of testicular pathology.
(ANOVA: AFP p=0.45, HCG p=0.88, LDH p=.069)



RPLND pathology showed teratoma in 22 of the 23 patients and no malignancy in one.

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