tuba, and another one with incomplete ovarian resection. One patient in this group that had initial laparotomy, needed a second look surgery post-chemotherapy. Most frequent tumour stage were FIGO IA in 51.7% of cases (36.8% in malignant tumours). The most frequent surgery (89.6%) was unilateral oophorectomy. 25/29 patients are alive and disease-free. In conclusion, the application of laparoscopic techniques to paediatric cancer patients is a safe and effective diagnostic, staging and treatment modality.

GCT-63 Imaging of germ cell tumours: Tips and tricks

M. Pantelidou[1], J. Pinney[1], A. Gomez[1], J. Hughes[1], P. Set[1], H. Addley[1]
[1]Department of Radiology, Addenbrooke's Hospital, Cambridge, UK

Background: Germ cell tumours account for 15% of ovarian tumours. Imaging of these patients provides important diagnostic information that is critical to appropriate management of these cases.
Methods: Typical imaging features will be demonstrated on different imaging modalities including ultrasound, CT and MRI. Features that are concerning for malignancy and distinguishing features for different types of germ cell tumour will be highlighted with particular reference to imaging protocols and acquisition. Examples of common pitfalls in image interpretation will be described. Diagnostic tips on image interpretation in residual and recurrent disease and benign mimics will also be demonstrated. This will be provided from cases reviewed at a tertiary centre of gynae-oncology cancer centre.
Conclusion: Correct image interpretation is vital to guide appropriate clinical patient management. Imaging of germ cell tumours can be challenging and awareness of common pitfalls as well as helpful features in interpretation of these cases is of benefit to the entire multidisciplinary team.

High-Dose Chemotherapy

GCT-64 High-dose chemotherapy (HDCT) for recurrent ovarian germ cell tumours (OGCT): A single centre experience

N. Sarwar[1], S. Suyanto[1], E. Kanfer[2], M.J. Seckl[1]
[1]Department of Medical Oncology, Charing Cross Hospital, London, UK; [2]Department of Haematology, Hammersmith Hospital, London, UK

Background: OGCT are a rare subtype of ovarian cancer accounting for less than 5% of malignant ovarian cancers. First-line platinum combination chemotherapy has a 70–80% cure rate. Scant data are available regarding the management of recurrent malignant OGCT. Here we present the outcomes with HDCT in patients with recurrent OGCT at Charing Cross Hospital, London, UK.
Methods: We performed a retrospective review of recurrent OGCT who underwent HDCT at Charing Cross Hospital. Demographics, disease variables, treatments and outcomes were analysed.
Results: Median age at the time of HDCT and histological subtypes will be presented as well as the median number of prior chemotherapy treatments. Median overall survival (OS) will be presented. The data will demonstrate that HDCT is an effective treatment for recurrent OGCT. Trials to prospectively evaluate HDCT as an early intervention in these patients seem justified.

GCT-65 The management of late relapse post chemotherapy in testicular cancer: Optimal outcomes with dose intense salvage chemotherapy and surgery

O. Lucas[1], P. Wilson[1], W. Ansell[1], B. Thomas[2], D. Berney[1], J. Shamash[1], C. Alifrangis[1]
[1]Barts Cancer Centre, St Bartholomew's Hospital, London, United Kingdom; [2]Department of Oncology, Addenbrooke's Hospital, Cambridge, United Kingdom

Background: Late relapse in advanced testicular cancer is defined as disease recurrence more than two years after primary therapy. The optimal management for this rare group of patients is unclear. We report one of the largest series to date of late relapse specifically following combination chemotherapy for metastatic disease, identifying prognostic factors and survival outcomes following relapse treatments.
Methods: We performed a retrospective analysis of patients treated for advanced testicular cancer in St Bartholomew's Hospital, London, UK between 1995 and 2016. We identified 53 cases of late relapse following chemotherapy for metastatic disease. Outcomes and interventions in this group were reviewed.
Results: Across the cohort, progression-free survival (PFS) at 36 months was 41% and overall survival was 61%. Multiple factors correlated with PFS.

1. Use of a dose-intense or high-dose relapse chemotherapy regimen significantly improved PFS compared to use of a conventional dose regimen (3 weekly ifosfamide-based regimens) ($p = 0.0036$, PFS 48 vs 9.8 months). Tumour burden between these two groups was similar, as evidenced by the lack of significant difference in levels of tumour markers.
2. Resection of residual disease post-relapse chemotherapy was associated with improved PFS ($p = 0.0076$, HR 3.46).
3. There was a non-significant trend towards worse PFS in the very late relapse group (>7 years from initial treatment).

This study provides new insight into prognostic factors in this rare late relapse group. These results suggest optimal treatment should include dose-intense/high dose chemotherapy when indicated and maximal surgical resection to all sites of disease.

GCT-66 Haematopoietic stem cell transplantation for children with germ cell tumours: Experience of the National Multicentric Paediatric Germ Cell Group

N.C. Villela[1], A. Seber[2], V.G. Zecchin[3], P.S. Ikeuti[1], G.E. Martins[4], L.F. Lopes[4]
[1]Department of pediatric HSCT, Hospital de Amor, Barretos, Brazil; [2]Department of pediatric HSCT, Hospital Samaritano, São Paulo, Brazil; [3]Department of HSCT, IOP/GRAACC, São Paulo, Brazil; [4]Department of pediatric oncology, Hospital de Amor, Barretos, Brazil

Background: High-dose chemotherapy with autologous haematopoietic stem cell transplantation (HSCT) is a therapeutic option mainly investigated in adult patients with germ cell tumours (GCTs). However, even in the adult population, the role of HSCT in GCTs remains controversial. Our objective is to describe the Brazilian experience with HSCT for children with GCTs.
Methods: We reviewed the medical records of all patients who underwent transplantation for treatment of extracranial GCTs at two Brazilian paediatric HSCT centres.
Results: From November 2001 to March 2018, 33 patients with GCT underwent autologous HSCT (17 male and 16 female). Their median

age was 9.3 years (1.8–19.9 years). Most patients had an extragonadal tumour (63.6%) and yolk-sac was the main histological subtype (48.5%). About 60% were metastatic at diagnosis. Regarding the pre-HSCT disease status: 4 patients were in first remission, 12 in second remission, 8 in third remission or beyond and 9 had refractory disease. The main conditioning regimen was with Carboplatin, Etoposide and Melphalan (72.7%). Three patients died from transplant-related complications (9%). Fifteen patients (45.5%) had disease progression or relapse after HSCT and 14 of them died. Fifteen patients (45.5%) are alive in complete remission, with a median follow up of 4.9 years (1.1–17.4 years). None of the 9 patients who had refractory disease at the beginning of the conditioning regimen survived. The role of HSCT in the treatment of children with GCTs should be investigated in prospective trials.

Poor-Risk Tumour Patients

GCT-67 Long term follow-up of the MRC TE23 randomized phase II trial of intensive induction chemotherapy (CBOP/BEP) in poor prognosis germ cell tumours (GCT) (CRUK/05/014; ISRCTN53643604)

R.A. Huddart[1], F. Cafferty[2], J.D. White[3], J. Shamash[4], I. Hennig[5], M.H. Cullen[6], S.P. Stenning[2], for the TE23 Trial Management Group and Collaborators and the NCRI Testis Cancer Clinical Studies Group
[1]The Institute of Cancer Research and the Royal Marsden NHS Foundation Trust, Sutton, UK; [2]MRC Clinical Trials Unit at UCL, London, UK; [3]Beatson West of Scotland Cancer Centre, Glasgow, UK; [4]St Bartholomew's Hospital, London, UK; [5]Nottingham University Hospitals NHS Trust, Nottingham, UK; [6]University Hospitals Birmingham NHS Foundation Trust, Birmingham, UK

Background: Up to 50% of men with poor-prognosis nonseminomatous GCT die with standard BEP chemotherapy. An intensive regimen, CBOP/BEP (carboplatin, bleomycin, vincristine, cisplatin/BEP), met response targets in a phase II, multicentre, open-label, randomized trial. Here, we report long term outcomes and prognostic factors.
Methods: Patients with extracranial GCT and IGCCCG poor-prognosis features were randomised to 4xBEP or CBOP/BEP (2xCBOP, 2xBO, 3xBEP with bleomycin dose 15,000 iu). Low-dose, stabilising chemotherapy prior to entry was permitted. This analysis focuses on progression-free survival (PFS), overall survival (OS) and toxicity (all secondary outcomes), and exploratory analysis of prognostic factors and the impact of marker decline (as defined in GETUG13).
Results: 89 patients (43 CBOP/BEP) were randomised. After median 63 months follow-up, 3-year PFS is 55.7% (95% CI 39.7%, 69.0%) for CBOP/BEP arm, 38.7% (24.7%, 52.4%) for BEP (HR 0.59 (0.33, 1.06), $p = 0.079$). 3-year OS is 65.0% (48.8%, 77.2%) and 58.5% (43.0%, 71.2%), respectively (HR 0.79 (0.41, 1.52), $p = 0.49$). 12-month toxicity was affected by subsequent treatments, with no clear differences between arms. There was no grade ≥3 late toxicity in the CBOP/BEP arm. In multivariate models, use of pre-protocol chemotherapy was the only factor associated with poorer PFS (HR 2.09 (1.14, 3.81), $p = 0.017$). Mediastinal primary (HR 2.13 (1.02, 4.46), $p = 0.045$) and use of pre-protocol chemotherapy (HR 3.40 (1.74, 6.63), $p < 0.001$) were associated with poorer OS. In this study, use of low dose induction chemotherapy was associated with poorer outcomes. Further study in an international phase III trial is warranted.

GCT-68 Haematological neoplasms arising in patients with primary mediastinal nonseminomatous germ cell tumour are clonally related and represent secondary somatic malignant differentiation

J. Taylor[1], M. Donoghue[2], B.S. Taylor[2], O. Abdel-Wahab[1], D.R. Feldman[3]
[1]Leukemia Service, Department of Medicine, Memorial Sloan Kettering Cancer Center, New York, USA; [2]Center for Molecular Oncology, Memorial Sloan Kettering Cancer Center, New York, USA; [3]Genitourinary Oncology Service, Department of Medicine, Memorial Sloan Kettering Cancer Center, New York, USA

Background: One in 17 patients with primary mediastinal germ cell tumour develops a haematological malignancy and the survival in such patients is poor. Intriguingly, the presence of isochromosome 12p, a clonal marker common to GCTs but absent in *de novo* myeloid neoplasms, has been demonstrated as shared across GCTs and myeloid neoplasms in such individuals. While these data suggest a clonal relationship between the two, the exact nature of the shared origin is unknown.
Methods: To trace the clonal evolution of these seemingly unrelated cancer types and identify recurrent genomic lesions in leukaemias present in GCT patients, we applied whole exome sequencing (WES), targeted genomic analyses, and/or RNA-seq to leukaemias, GCTs, and germline DNA in a series of patients with myeloid neoplasms and concurrent GCTs.
Results: We studied 12 patients with GCT and synchronously or metachronously occurring myeloid neoplasms (8 AML, 5 MDS/CMML, 2 histiocytic sarcoma (some had >1 haematologic malignancy)) with an average of 4 months between the two diagnoses. All were young men (median age 26 years) with PMGCT and nonseminomatous histology and a 3-month median survival from leukaemia diagnosis. In each case, at least one copy number alteration or coding mutation was shared across the GCT and hematopoietic neoplasm, demonstrating the shared origin of both lesions. The most common genomic alterations in leukaemias beyond i(12p) included mutations activating RAS-PI3K-AKT signalling or inactivating TP53. These data conclusively demonstrate that myeloid neoplasms developing in patients with PMGCT represent secondary somatic differentiation of cells that are present in the GCT.

Debate

GCT-69 Debate: This house believes that BEP should no longer be standard therapy for poor risk disease: Opposing view

C.J. Sweeney[1], D. Mazhar[2]
[1]Department of Medicine, Dana Farber Cancer Institute, Harvard Medical School, Boston, US; [2]Department of Oncology, Cambridge University Hospitals NHS Trust, Cambridge, UK

Background: Since the addition of etoposide and cisplatin to bleomycin in the 1980s, the BEP regimen has been the international standard for poor risk germ cell tumour (GCT). In this debate, we review the relevant data and detail the phase 3 trials that have failed against BEP. We also outline the strategies that have been more successful than changing current cytotoxic options in poor risk GCT,