

Pelvic Ewing's Sarcoma: our experience and evaluation of prognostic factors

Royal Orthopaedic Hospital,
Birmingham

A Dramis, RJ Grimer, KN Malizos, RM Tillman,
A Abudu, L Jeys, SR Carter



Ewing's sarcoma

Major reported prognostic factors are:

- site
- tumour volume
- metastases at diagnosis
- response to chemotherapy

Pelvic EWS have worse prognosis than those in extremities:

- ✓ Delay in diagnosis
- ✓ Higher incidence of lung metastases compared to those with non-pelvic EWS
- ✓ No major anatomic barrier to tumour spread
- ✓ Proximity to visceral organs and neurovascular bundles makes local control difficult

The optimal management of Pelvic EWS remains a challenge

- Aggressive Chemotherapy and Surgery remain the mainstay of treatment

Ahrens S, Hoffmann C, Jabar S, Braun-Munzinger G, Paulussen M, Dunst J, et al. Evaluation of prognostic factors in a tumor volume-adapted treatment strategy for localized Ewing sarcoma of bone: the CESS 86 experience. Cooperative Ewing Sarcoma Study. *Med Pediatr Oncol* 1999;32:186–95.

Wilkins RM, Pritchard DJ, Burgert EO Jr, Unni KK. Ewing's sarcoma of bone. Experience with 140 patients. *Cancer* 1986;58:2551–5.

Evans RG, Nesbit ME, Gehan EA, Garnsey LA, Burgert O Jr, Vietti TJ, et al. Multimodal therapy for the management of localized Ewing's sarcoma of pelvic and sacral bones: a report from the second intergroup study. *J Clin Oncol* 1991;9:1173–80.

- Radiotherapy is useful when the surgical margins are inadequate or the histological response to chemotherapy is poor

Dunst J, Jurgens H, Sauer R, Pape H, Paulussen M, Winkelmann W, et al. Radiation therapy in Ewing's sarcoma: an update of the CESS 86 trial. *Int J Radiat Oncol Biol Phys* 1995;32:919–30

Donati D, Yin J, Di Bella C, Colangeli M, Bacci G, Ferrari S, Bertoni F, Barbieri E, Mercuri M. Local and distant control in non-metastatic pelvic Ewing's sarcoma patients. *J Surg Oncol*. 2007 Jul 1;96(1):19-25.

Aims and Methods

- ✓ To determine the overall survival and recurrence free survival of patients with Pelvic Ewing Sarcoma
- ✓ To identify possible prognostic factors

Pelvic EWS treated in the Orthopaedic Oncology Unit at Royal Orthopaedic Hospital between 1977 and 2009

Patient Characteristics

- 146 patients
- 80 Males and 66 females
- Median age 16 years (2-60)
- 140 boney and 6 soft tissue tumours
- 42 patients (29%) with metastases at diagnosis
- Mean follow-up 51 months (range, 3-343)

Exclusion Criteria:

- ✓ Patients with bone metastases at diagnosis (N=13)
- ✓ Patients referred for opinion (N=10)

123 patients eligible for analyses on prognostic factors

Site

P1 (Ileum): 75

P2 (Periacetabulum): 5

P3 (Pubis): 29

P4 (Hemisacrum): 7

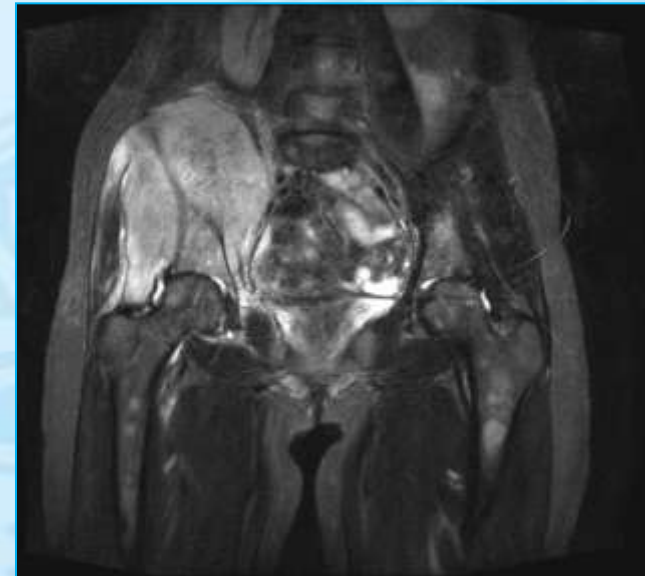
P12 (Ileum + Periacetabulum): 2

P23 (Periacetabulum + Pubis): 7

P14 (Sacroiliac): 10

P123 (Hemipelvis): 5

Mean Volume 535ml
(range 2.5 to 2593ml)



Treatment

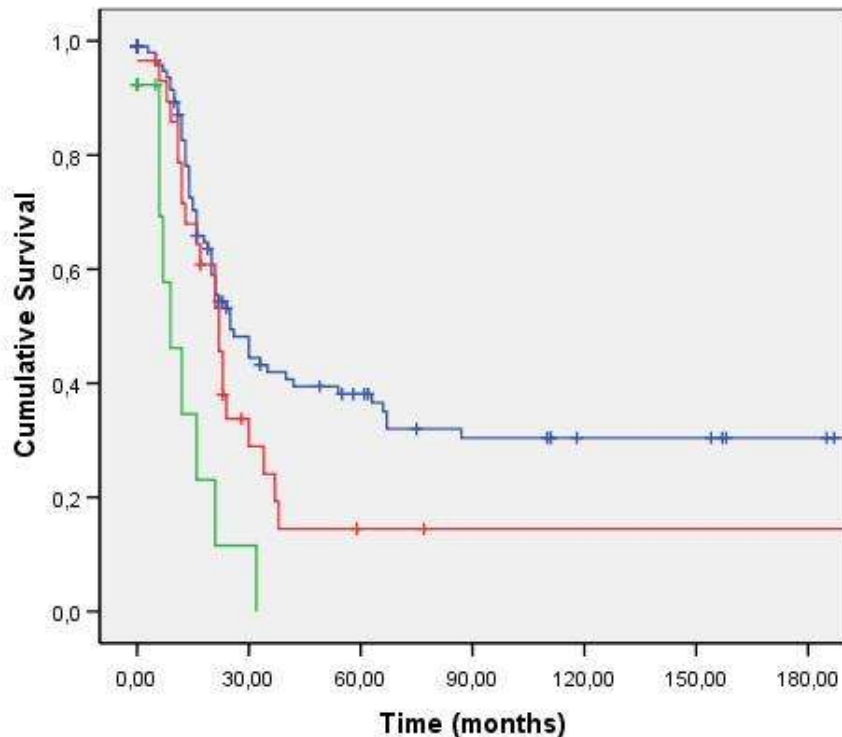
- In general patients with small tumours had chemotherapy and surgery, as did those with P2/3 tumours
- P1/2 usually treated with chemotherapy and RT
- RT added to surgery for close margins or poor necrosis

Treatment groups

- chemotherapy + RT (n=94)
- chemotherapy + surgery (n=28)
- chemotherapy + surgery + RT (n=14)



Results- Survival



— No Mets

— Lung Mets
(HR:1.75, p=0.03)

— Bone Mets
(HR:4.58, p<0.001)

Survival Analysis

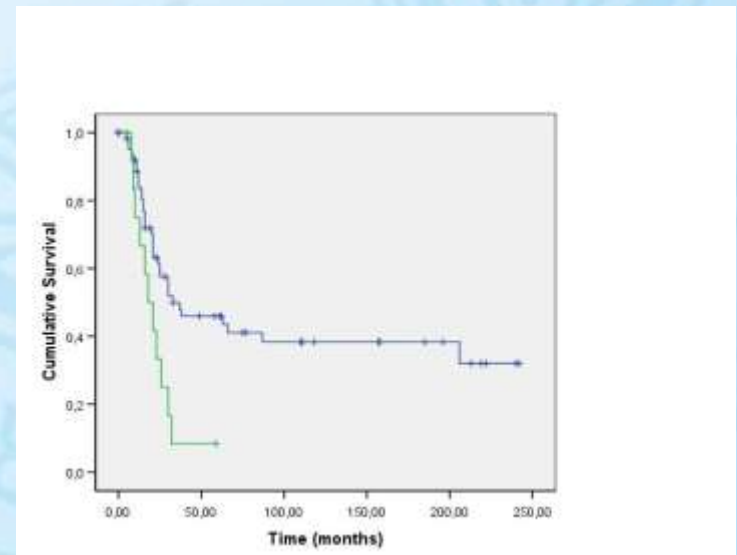
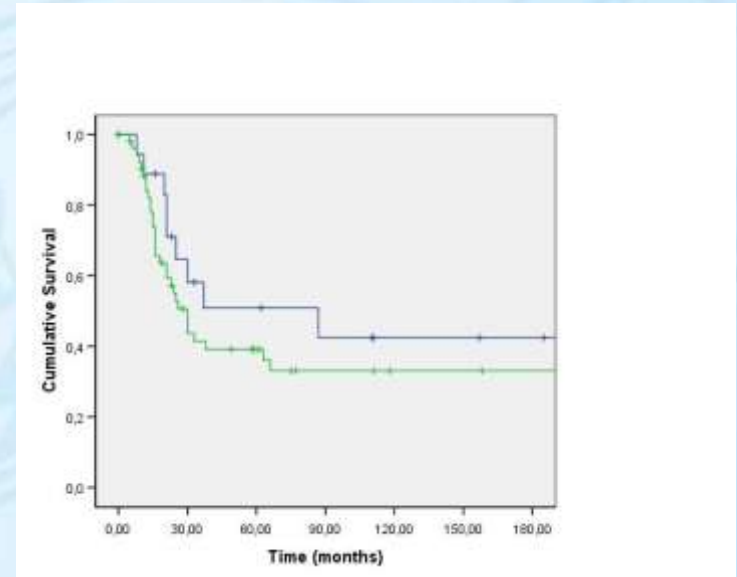
- 5-year Survival 32.9%
- 10-year Survival 26.7%

BAD FACTORS

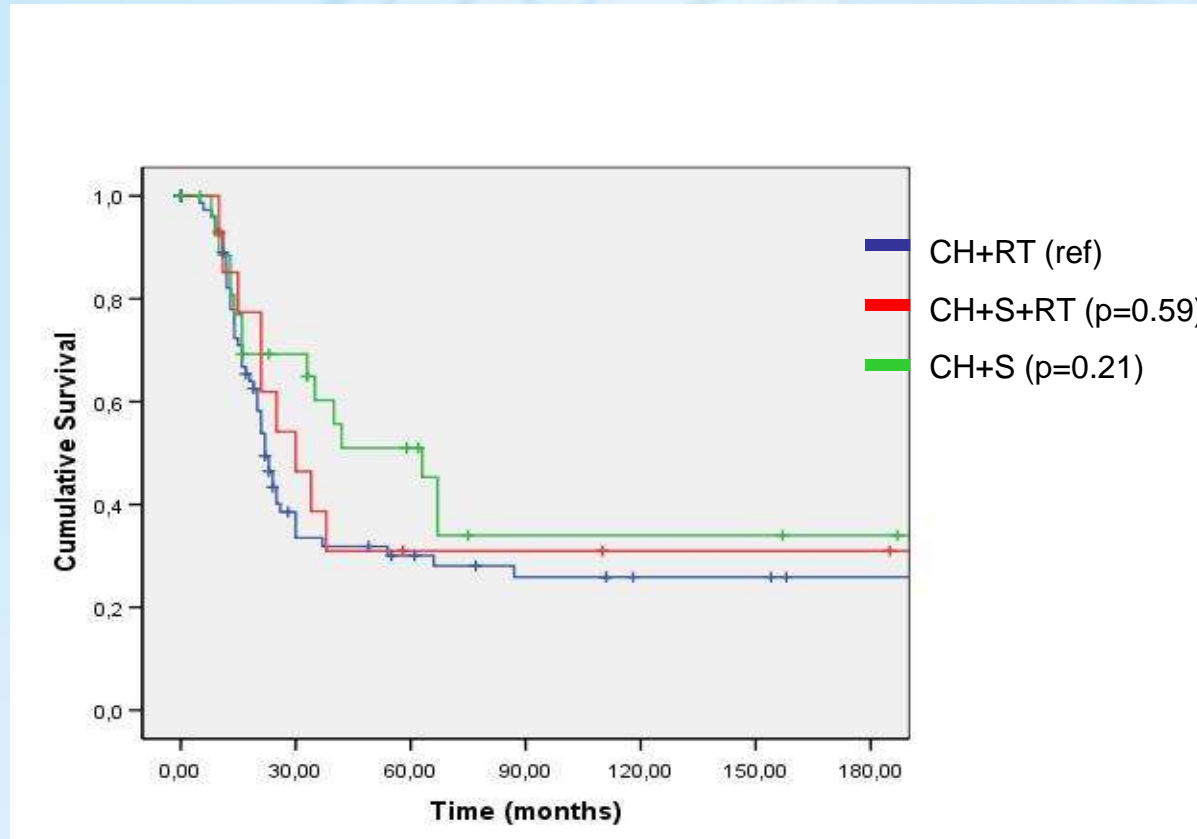
- Periacetabular location (reference ileum) (HR:3.47, $p=0.04$)
- Tumour volume

Tumour volume and Survival

- Trend for improved survival rates for tumours <200 ml vs ≥ 200 ml, but NS
- Tumours ≥ 1000 ml, 2.5 increased risk of death ($p=0.01$)



Overall Survival by Treatment Groups



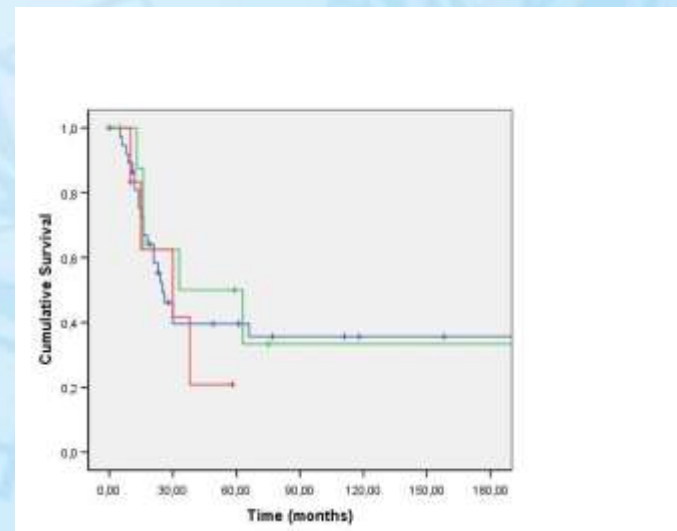
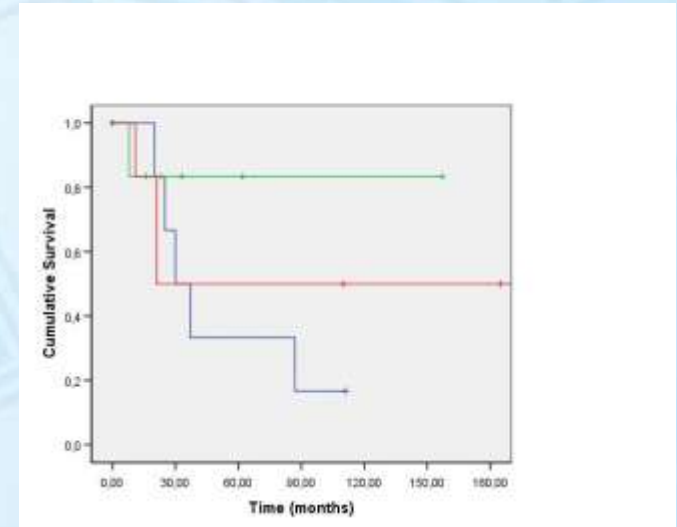
Trend for improved survival in the group of
Chemotherapy and Surgery (NS)

Treatment outcome in different tumour volumes

➤ More apparent improved outcomes for chemo and surgery in small tumours (NS, BUT n=19)

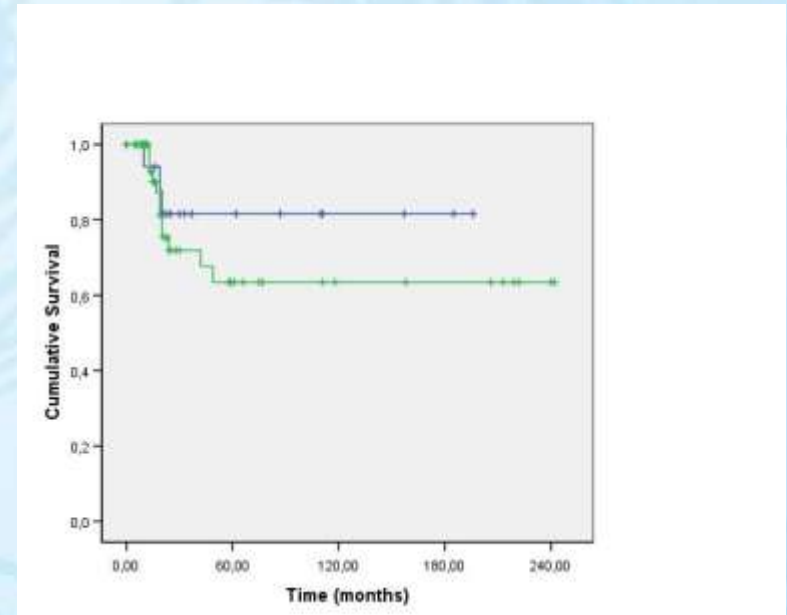
- CH+RT
- CH+S+RT
- CH+S

➤ No difference in large tumours (≥ 200 ml)



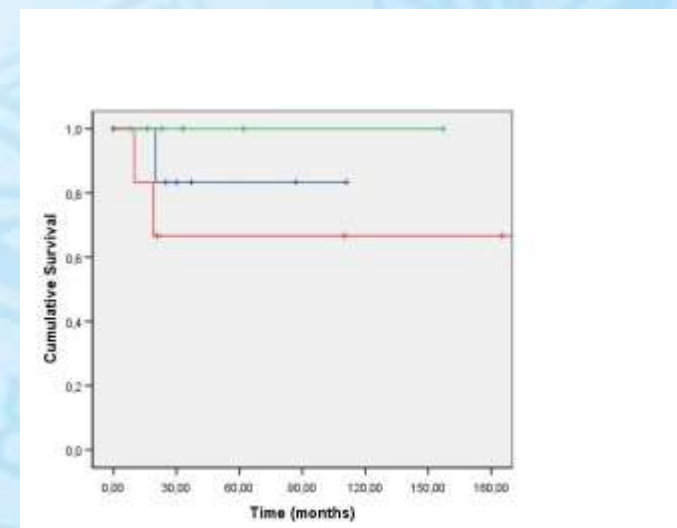
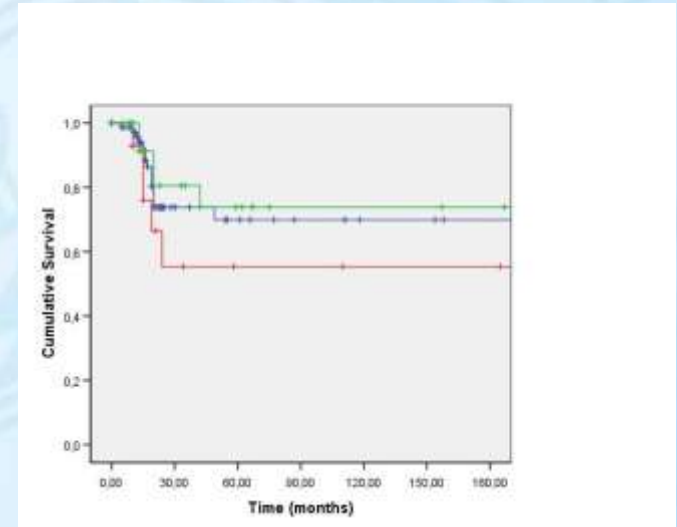
Local Recurrence Outcomes

- ✓ 25 patients (20%) developed LR
- ✓ 5- and 10-year recurrence free rates 68.2%
- ✓ Trend towards decreased risk for LR in small tumours



Treatment group outcomes for local control

- Trend towards improved local control with CH+S (NS)
- More apparent improved local control with CH+S in small tumours (NS, but n=19)



Conclusion

- Treatment of Pelvic EWS is still controversial
- Metastases at diagnosis (especially bone), periacetabular location and tumour volume were significant prognostic factors
- Our experience shows a trend for improved survival and local control rates for patients who had combined chemo and surgery.
- More apparent results in small tumours
- The morbidity and functional outcome of patients after surgery need to be measured against the risk of local recurrence and the development of secondary malignancy after radiation

Thank you

