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**All India Institute of Medical Sciences,  
New Delhi, INDIA**



# Neuroblastoma 4s: Outcome from AIIMS NB 96 study

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## NB- 4s: Introduction

- Incidence of stage NB 4s: 7-10%
- Most (96%) have favorable Shimada histology
  - < 10% have N-myc amplification
- One-third regress spontaneously
- Two-thirds require some treatment



# NB- 4s: Introduction

- Indications for chemotherapy
  - severe respiratory distress
  - progressive disease
  - N-myc amplification



## NB- Resection: Aim

To review our Institution's experience  
with 4s neuroblastoma,  
evaluating the presentation, management  
and outcome



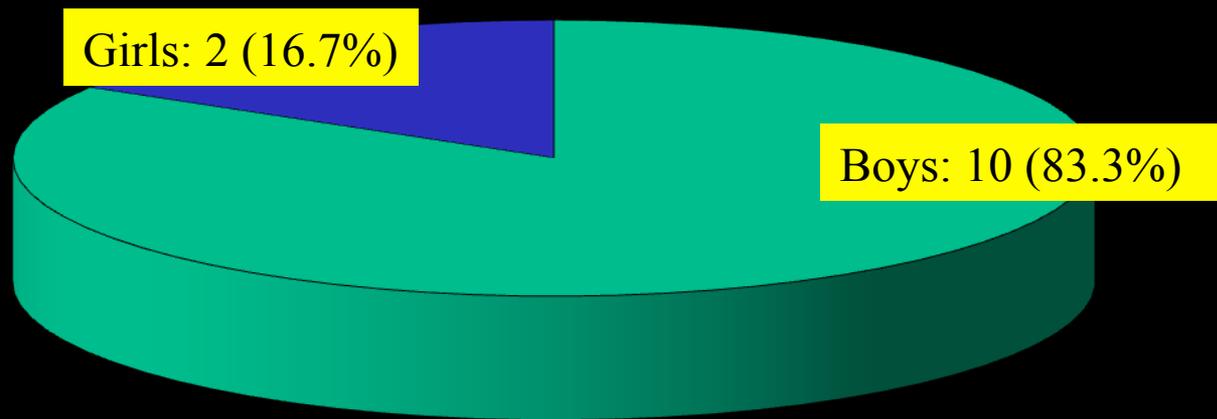
# NB- 4s: Materials and Methods

- Prospective study
- Period: May 1996- July 2009
- Staging- INSS
- Chemotherapy for symptomatic patients
  - Cyclophosphamide + Doxorubicin
  - Cyclophosphamide + Vincristine (2006)
- Resection of residue after chemotherapy



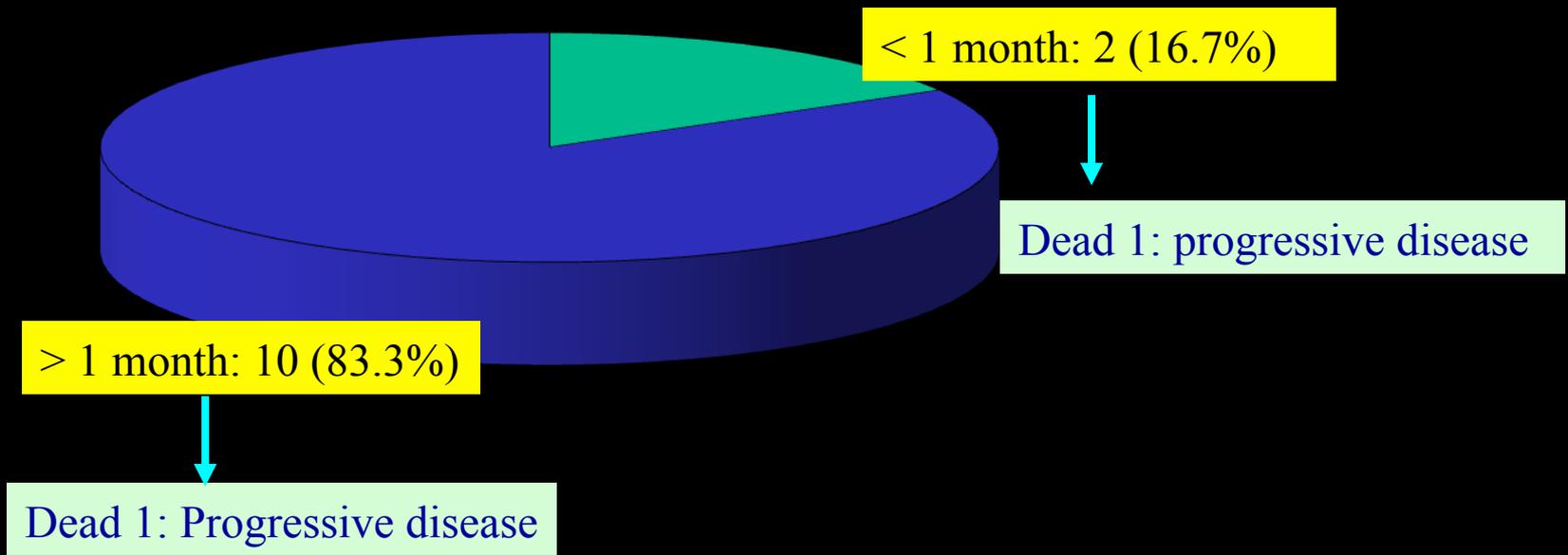
# NB-4s: Results

- Number of NB = 144
- Number of NB 4s = 12 (8.3%)
- Sex distribution





# NB- 4s: Results (n = 12) Age Distribution





# NB-4s: Results Presentation

NB 4s (n=12)

9 (75%): Resp. distress

3 (25%): Asymptomatic  
hepatomegaly





# NB-4s: Results

## Site of primary tumor

NB 4s (n=12)

Adrenal = 8 (67%)

Occult = 3 (25%)

Extra-adr = 1 (8%)





# NB-4s: Results

## Site of metastatic tumor

NB 4s (n=12)

Liver = 12 (100%)

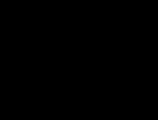
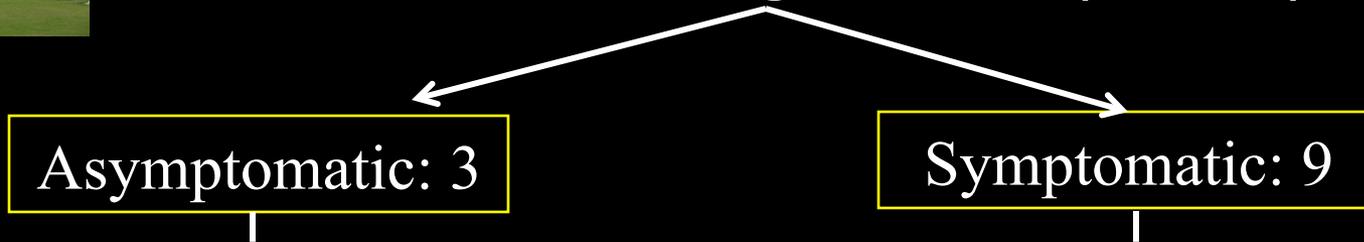
BM = 2 (16.7%)

S/C nodules = 1 (8.3%)



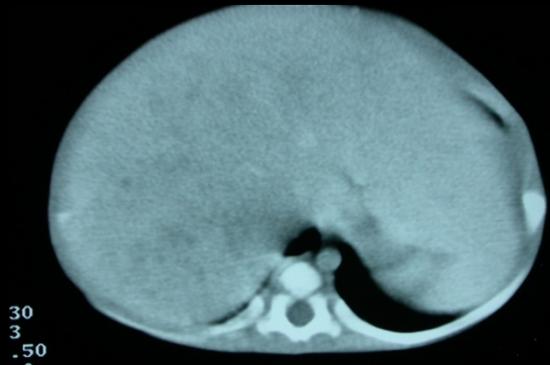
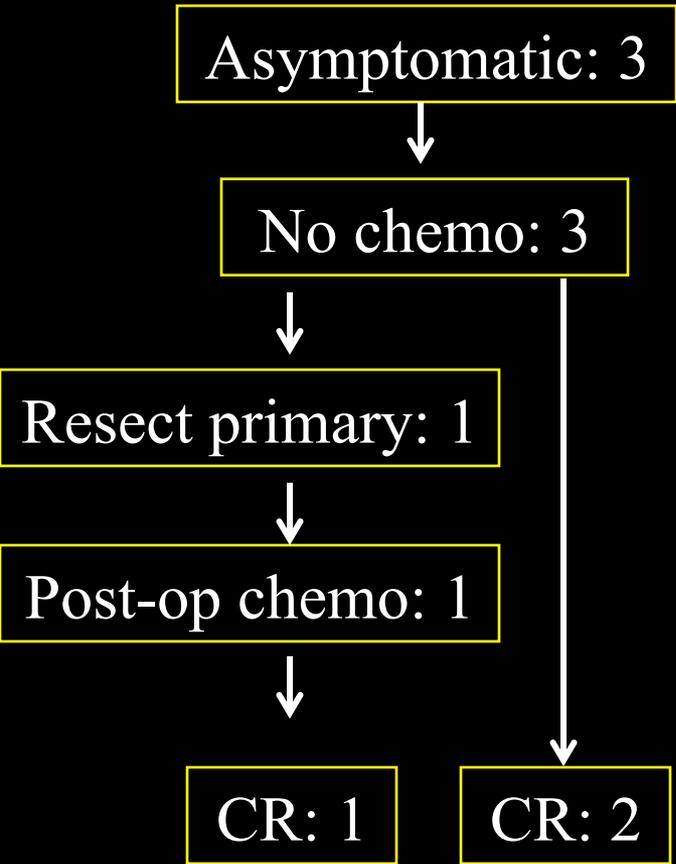


# NB-4s: Management (n=12)

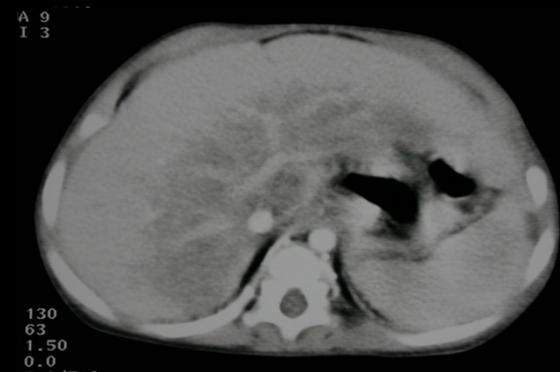




# NB-4s: Management (n=12)



Presentation



Follow-up



Follow-up at 8 yrs



# NB-4s: Management (n=12)

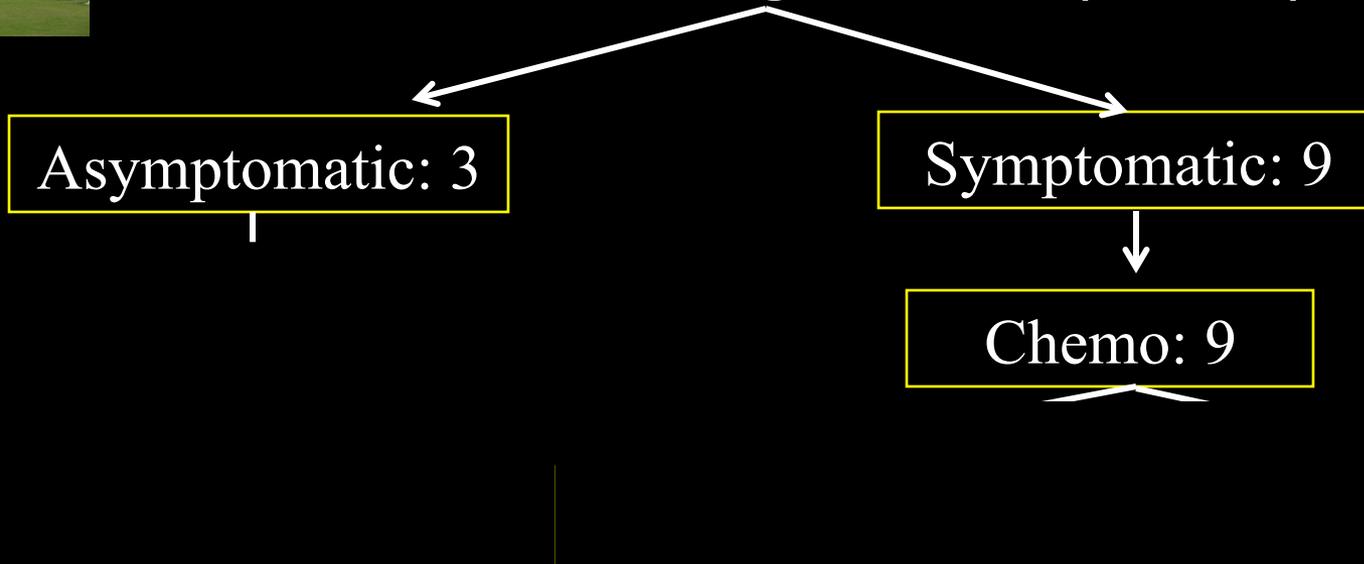


Asymptomatic: 3

Symptomatic: 9

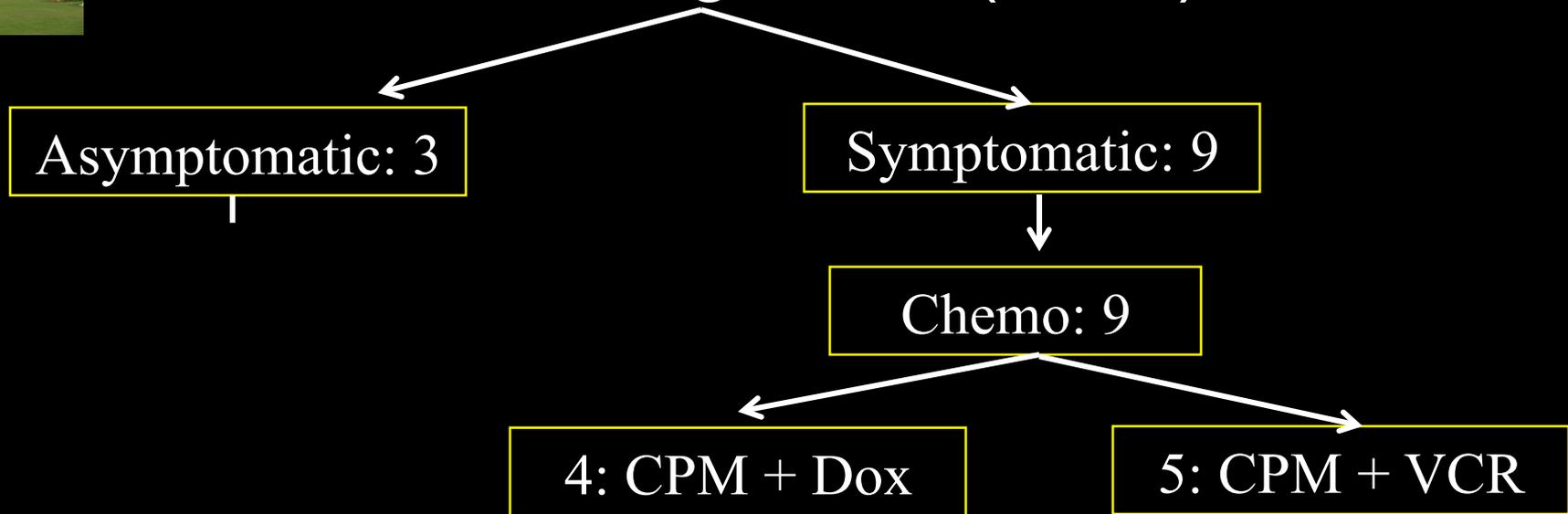


# NB-4s: Management (n=12)





# NB-4s: Management (n=12)



# NB-4s: Management (n=12)



Symptomatic: 9

Chemo: 9

Prog. Disease: 2

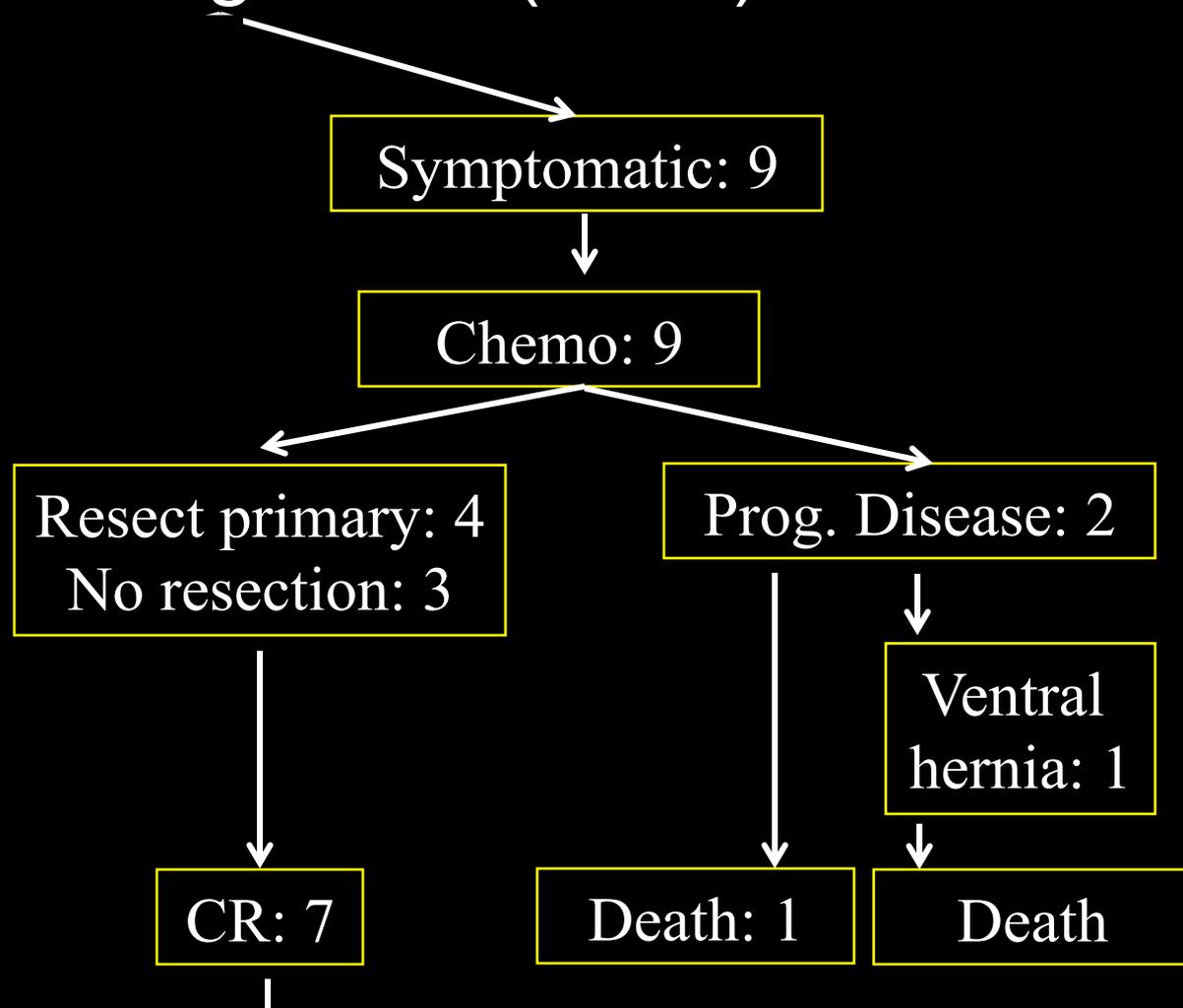
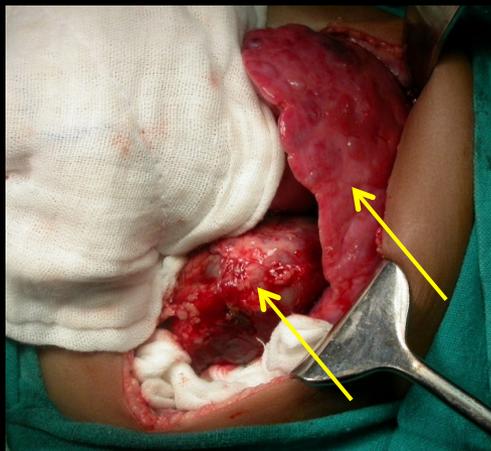
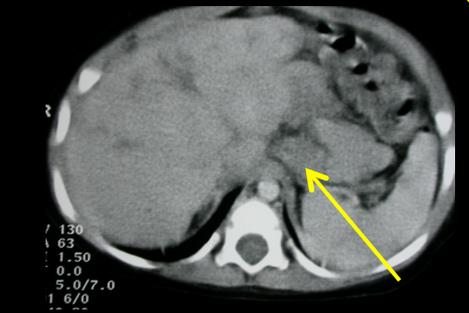
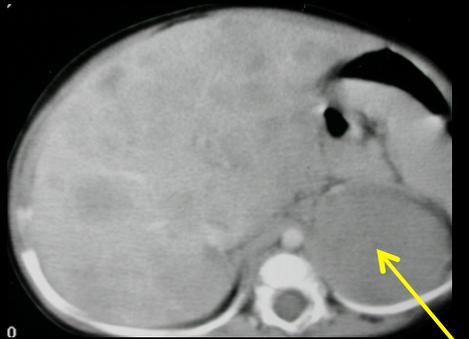
Ventral  
hernia: 1

Death: 1

Death

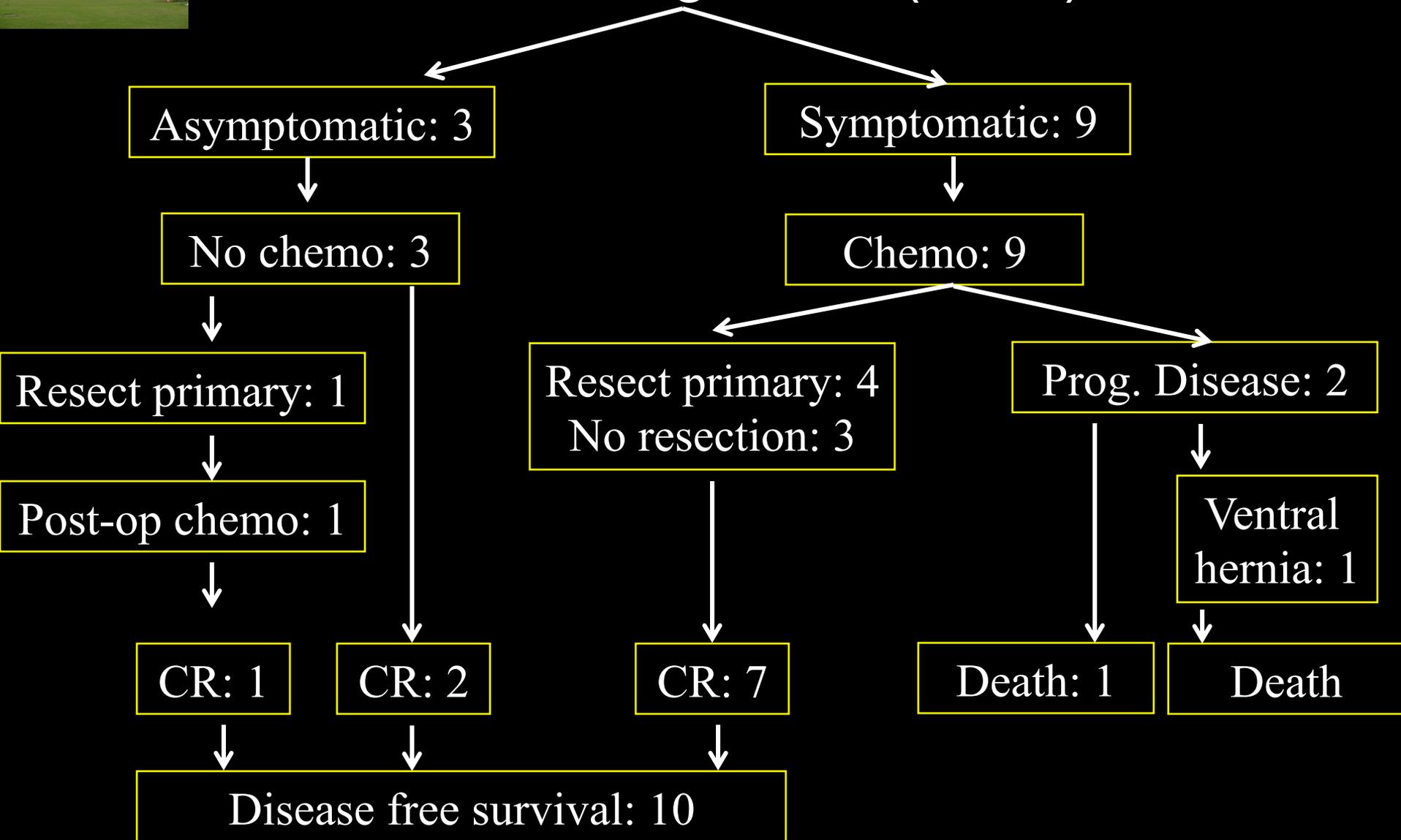


# NB-4s: Management (n=12)





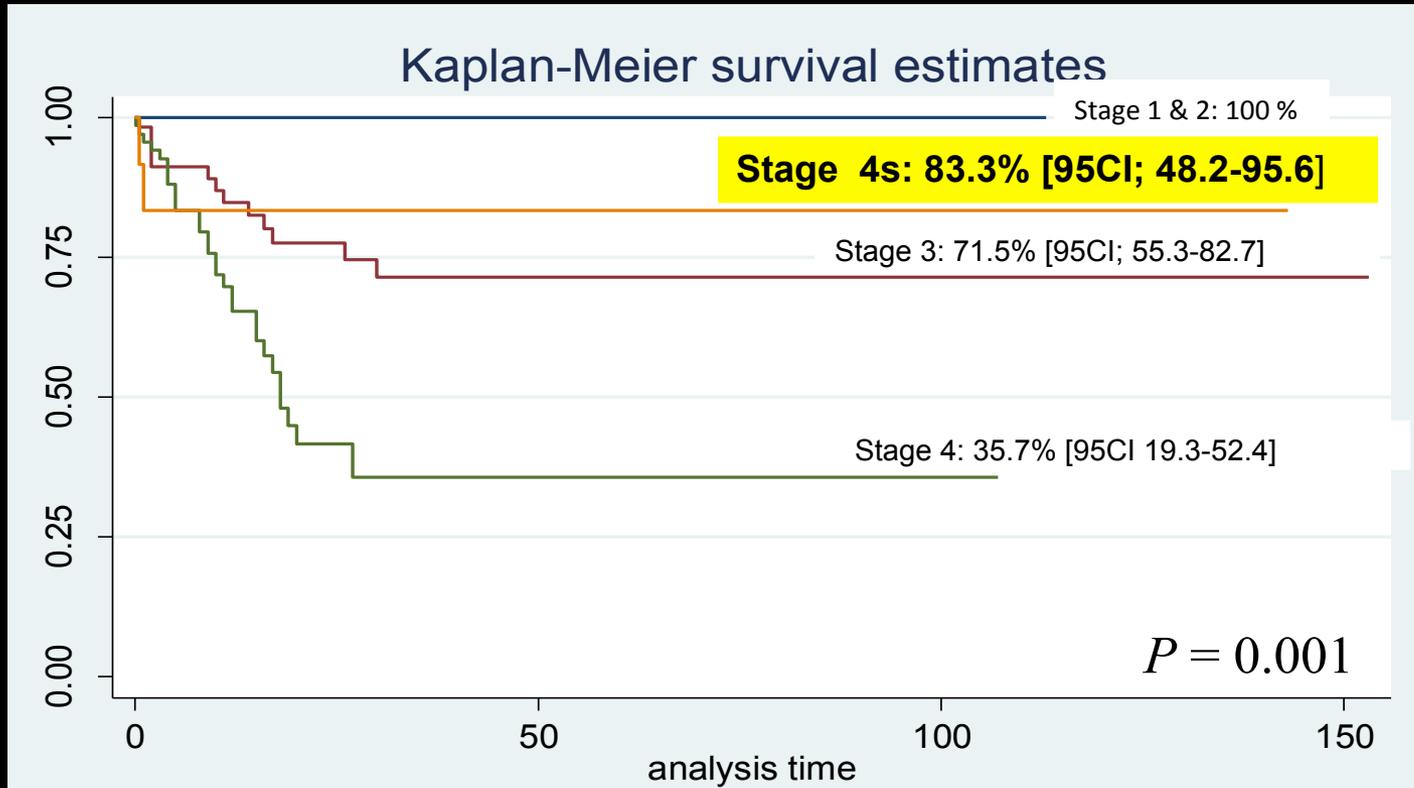
# NB-4s: Management (n=12)





# NB-4s: Outcome (n=12)

## Cumulative Survival



## Survival Period



# NB-4s: Discussion



- Treatment modalities:
  - observation with supportive care
  - low dose chemotherapy
  - radiotherapy
  - surgical creation of ventral hernia
- Role of surgical resection of primary tumor is debatable but most resect the primary tumor



# NB-4s: Discussion

- Overall survival is 70-97%
- Poor prognostic factors
  - age < 2 months
    - due to respiratory, renal, GI compromise and coagulative disturbances
  - Increased serum ferritin/ LDH/ NSE
  - poor Shimada histology, N-myc amplification and tumor diploidy



# NB-4s: Conclusion

- NB 4s incidence in current study: 8.3%
- 75% were symptomatic (resp. distress)
- 75% had detectable primary tumor
- Spontaneous resolution: 16.7%
- Overall survival: 83.3%



Thank You