

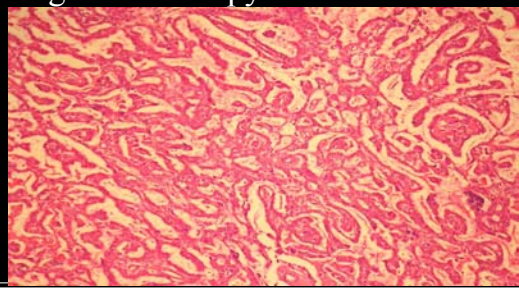
Case 4

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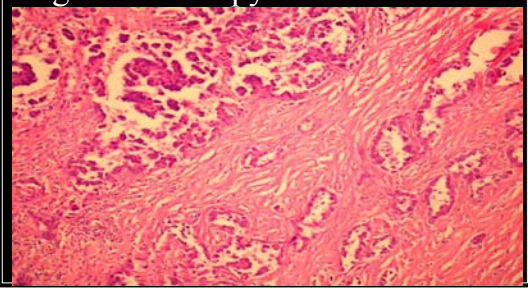
Case 4 – clinical history

- A male aged 56 had recurrent left sided chest pain and pleural effusions over 12 months. A pleural biopsy was performed.
- He was an ex-smoker.
- His past medical history included radiotherapy and chemotherapy for a left sided neck Hodgkin's lymphoma at age 34 (stage 1A).
- He was a technical assistant in quality control at a factory producing rubber goods.

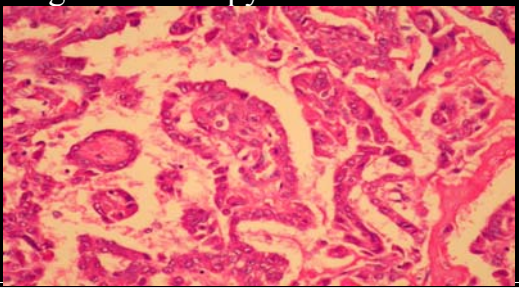
Light microscopy



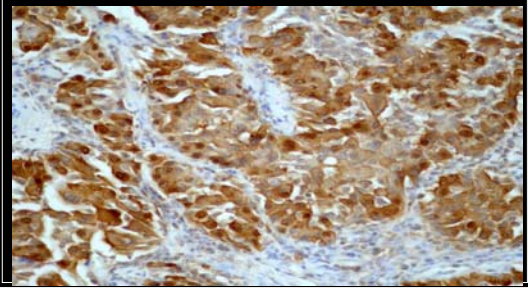
Light microscopy



Light microscopy



Calretinin



Results of immunohistochemistry panel

- Broad spectrum cytokeratin (AE1/AE3), calretinin, CK5/6 positive
- CEA, CD15, MOC31, Ber EP4 and TTF-1 negative

Results of autopsy

- Pleural based tumour consistent with mesothelioma
- No pleural plaques
- No asbestos bodies on light microscopic examination
- Asbestos fibres within background by digestion analysis with TEM

Diagnosis

Radiation induced malignant mesothelioma

Aetiology of malignant mesothelioma

- Asbestos (amphibole)
- Non-asbestos mineral fibres – erionite
- Radiation
- Chronic inflammation
- Virus (SV40)

Evidence for radiation induced malignant mesothelioma

- Animal studies : Inoculation
inhalation
some evidence of synergism between asbestos and radiation
- Approximately 50 case reports of MM following radiation treatment for a variety of malignant tumours including lymphoma, breast cancer, testicular cancer & Wilm's.
- Population based studies – variable results.

Neugut et al. study (1997)

- Retrospective cohort study of :
- 251,750 women with previously treated breast cancer; 24.8% had received radiotherapy.
- 13,743 people with Hodgkin's disease ; 50.6% had received radiotherapy.
- RR for malignant mesothelioma after radiotherapy was 1.56 (95% CI. 0.18-5.63)
- Conclusion : no association

Van Kaick et al. study (1999)

- 2,326 patients who had received thorotrast compared with 1,890 controls
- Excess rates of liver cancer (454:3), bile duct/gall bladder cancer (42:7) and malignant mesothelioma of pleura or peritoneum (9:0).

Travis et al. study (2005)

- 14 population based tumour registries in Europe and North America (1943-2001) were examined.
- 40,576 1-yr survivors of testicular cancer were identified and any new incident solid tumours among these patients was ascertained.
- Statistically elevated risks for developing a second tumour were noted in patients treated with chemotherapy alone, radiotherapy alone and combined treatment. Tumours included malignant mesothelioma of the pleura (RR=3.4, 95%CI = 2.8 to 4.6)

Contrasting features between asbestos and radiation related MM

	Asb	Rad
■ Median age at diagnosis	50-70	43
■ Median latent period	20-40	18
■ Male to female ratio	9:1	5:4
■ Pleura/peritoneum	4:1	2:1

K D Crew et al. 2005. In Malignant Mesothelioma eds H.I.Pass et al. Pages 350-363. Springer.

Criteria for attribution of MM to radiation

- History of exposure to radiation
- Poor, weak or negative asbestos exposure history.
- Appropriate latency usually in excess of 10 years.
- Absence of markers of exposure to asbestos, plaques, asbestos bodies and asbestosis.
- Ideally lung mineral fibre analysis shows background levels of asbestos fibres.

References

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- Neigut AI et al. Cancer 1997; 80 : 948-950
- Von Kaick et al. Radiat Res 1999; 152 (suppl 6) :S64-71
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