Virchows Archiv (1994) 424:213–216

CASE REPORT

Beatriz Lifschitz-Mercer · Magda Open
Ilana Kushnir · Bernard Czernobilsky

Epidermoid cyst of the spleen: a cytokeratin profile with comparison to other squamous epithelia

Received: 26 July 1993 / Accepted: 21 October 1993

Abstract The stratified squamous epithelium of a splenic epidermoid cyst was studied with a battery of monoclonal antibodies to cytokeratin (CK) proteins. CKs 10 and 11 were found in the suprabasal layers of the stratified squamous epithelium, while staining for CK 13 was focal or diffuse throughout. CKs 18 and 19 decorated individual squamous cells or stained the entire thickness of the epithelium. These results were compared with those previously obtained by us in stratified squamous epithelia of ovarian mature cystic teratoma, fetal epidermis, adult epidermis and squamous metaplasia in a peritoneal cyst. From these comparisons it emerges that the epidermoid splenic cyst is either of teratomatous derivation or originates from inclusion of fetal squamous epithelium. Squamous metaplasia of mesothelium or inclusions of mature squamous epithelium appears to be an unlikely source of origin of these cysts.

Key words Spleen · Epidermoid cyst · Cytokeratins

Introduction

Splenic cysts have been classified as parasitic and non-parasitic. Parasitic cysts are caused primarily by echinococcal infection. Non-parasitic cysts can be further divided into true or false. The latter have no epithelial or endothelial lining and result from trauma, haemorrhage or infarction. In contrast most true cysts, which usually occur in children and adolescents, have an epithelial lining which is partly or wholly stratified squamous. These are usually referred to as epidermoid cysts (Talerman and Hart 1970; Tsakraklides and Thomas 1973; Robbins et al. 1978; Buerrig 1988). The histogenesis of these cysts has not yet been elucidated although a number of hypotheses have been proposed.

In recent years intermediate filament typing and, in the case of epithelial lesions, cytokeratin (CK) specific immunological probes have been used extensively as tools in diagnostic surgical pathology in order to study cellular differentiation and as an indicator of possible histogenetic pathways (Franke et al. 1981; Osborn and Weber 1983).

In the present paper the CK profile of an epidermoid cyst of the spleen is investigated and the results compared to CK profiles previously observed in other stratified squamous epithelia. The conclusions serve as a basis for a histogenetic hypothesis for splenic epidermoid cysts.

B. Lifschitz-Mercer (✉) · M. Open · I. Kushnir
B. Czernobilsky
Department of Pathology, Kaplan Hospital, Affiliated to the Medical School of the Hebrew University and Hadassah, Rehovot 76100, Jerusalem, Israel

Case report

The patient, an 18-year-old woman, was admitted to the hospital with a 2-week history of fever and night sweats. Physical examination revealed an enlarged spleen containing a cyst replacing almost the entire organ. The spleen was resected.

The specimen consisted of a spleen weighing 150 g and measuring 10 × 10 × 6 cm. Most of the parenchyma was replaced by a multiloculated cyst measuring 10 × 7 × 3 cm. The outer surface of the cyst was smooth. The cyst wall was calcified in areas. The inner surface had a trabeculated appearance. It contained about 1 l of cloudy, brownish fluid.

On microscopic examination the cells lining the inner surface ranged from a single layer of flat and/or cuboidal epithelium to stratified squamous epithelium of varied thickness, but without keratinization. Skin adnexae were not detected. The remaining spleen was unremarkable.

Materials and methods

Immunohistochemical studies on formalin-fixed, paraffin-embedded tissue were carried out using standard immunoperoxidase techniques (Lifschitz-Mercer et al. 1991).

The primary monoclonal antibodies used are listed in Table 1.

The bound antibodies were visualized by applying the avidin-biotin peroxidase complex (ABC) protocol (Hsu et al. 1981) using the Vectastain Elite, ABC Kit (Vector, Burlingame, Calif., USA).

Table 1 Primary cytokeratin (*CK*) monoclonal antibodies used

Antibody	Antigen recognized and normal epithelia stained	Source
AE1, AE3	Broad range of CKs (all epithelia)	Biogenix, San Ramon, Calif., USA
K_s 8.60	CK 10, 11 (stratified squamous keratinizing epithelium)	Biomakor, Rehovot, Israel
K_s13	CK 13 (stratified non-keratinizing epithelium)	Progen, Heidelberg, Germany
Cy 90	CK 18 (simple epithelium)	Biomakor
K_s 19	CK 19 (simple epithelium)	Biomakor

Table 2 Cytokeratins in stratified squamous epithelium of splenic cyst as compared to other stratified squamous epithelia (+ all layers, +° suprabasal)

CK	Epidermoid cyst of the spleen	Epidermis in mature ovarian cystic teratoma	Fetal epidermis (16–17 weeks)	Adult epidermis	Squamous metaplasia, in a peritoneal cyst.
Broad spectrum	+	+	+	+	+
CK 10, 11	+°	+°	+°	+°	Focal
CK 13	+°	+	Basal, +	Basal	+
CK 18	+	Focal, +	Focal	−	Basal
CK 19	+	Basal, focal, +	Basal, focal	−	+

Results

The simple and stratified epithelial lining cells of the cyst stained positively with the broad spectrum CK antibody. The flat and cuboidal epithelial cells also stained for CK proteins 18 and 19.

The antibodies to CK proteins 10, 11 and 13 stained the suprabasal layers of the stratified squamous epithelium. CK 18 decorated the entire thickness of the stratified squamous epithelium. The latter was also stained throughout intensely with CK 19 (Fig. 1A–D).

Comparison of the above staining reactions with those previously reported by us in stratified squamous epithelium of ovarian mature cystic teratoma, fetal epidermis, adult epidermis, exocervical mucosa and endocervical squamous metaplasia, as well as with presently studied squamous metaplasia in a peritoneal cyst, is summarized in Table 2.

Discussion

A number of hypotheses relating to the origin of congenital splenic epidermoid cysts have been advanced. Among the most widely accepted histogenic mechanism is that of mesothelial inclusions within the spleen during embryogenesis with subsequent squamous metaplasia (Case et al. 1971; Ough et al. 1981; Buerrig 1988). Another hypothesis suggested is that these cysts develop from embryonal squamous epithelial inclusions (Bhaskaran et al. 1991; Nerlich and Permaretter 1991). Immunohistochemical studies to date using a very restricted battery of antibodies, have not been helpful in elucidating the histogenesis of these cysts (Gaudio et al. 1989; Cremades et al. 1990).

In the present study the CK profile of the stratified squamous epithelium of the epidermoid splenic cyst was similar to the fetal type CK profile observed in stratified squamous epithelium of ovarian mature cystic teratoma (Czernobilsky et al. 1989) as well as to that of the epidermis of 16- to 17-week-old fetuses (Czernobilsky et al. 1989). Thus, in spite of the histological maturity of the stratified squamous epithelium of the splenic cyst, its CK pattern was similar to that seen in ovarian mature cystic teratoma of fetal type. In addition the CK profile of the splenic cyst lining differed, especially with regard to CK 18, from that seen in adult epidermis (Czernobilsky et al. 1989) and in squamous metaplasia of a peritoneal cyst. Thus, the CK profile of the splenic epidermoid cyst showed features similar to fetal, rather than to mature, stratified squamous epithelium or to squamous metaplasia (Table 2). Since the various CK patterns encountered in normal epithelia depend on the type of the epithelium rather than on its anatomical location, the above comparison of the CK profile in different epithelia from various sites can be considered valid.

Our results do not necessarily imply that epidermoid splenic cysts constitute cystic teratomas although such an origin cannot be ruled out. Skin appendages, as seen in ovarian mature cystic teratoma, have also been described in splenic cysts which have been referred to by some authors as dermoid cysts (Panossian et al. 1990). The occurrence of mucinous splenic cysts (Miracco et al. 1986; Morinaga et al. 1992), as well as the report of a malignant teratoma of the spleen (Papke and Radke 1990), may also add some support to a teratomatous histogenesis of these cystic structures.

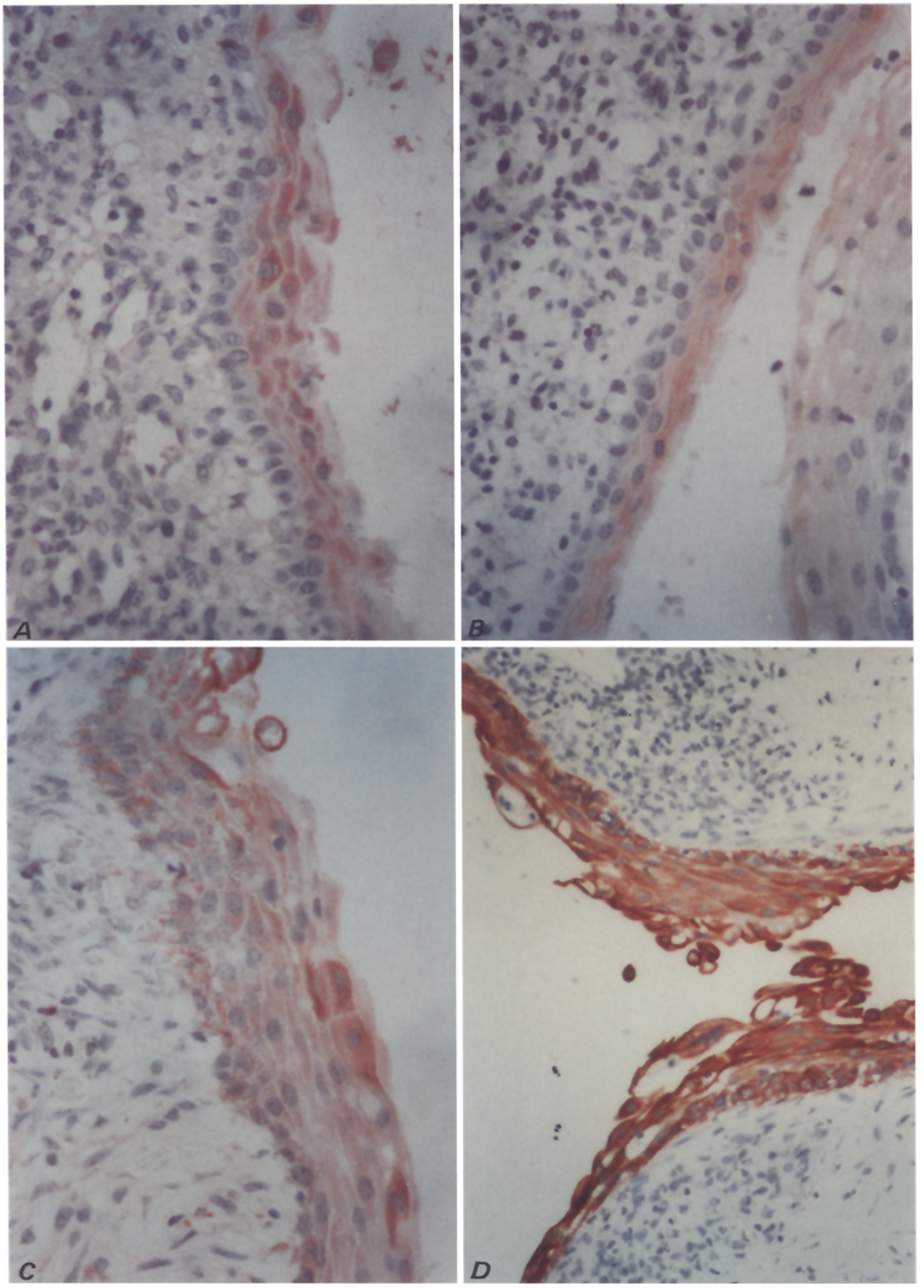

Fig. 1A–D Stratified squamous epithelium of splenic cyst stained for cytokeratins (CKs) using immunoperoxidase method on formalin-fixed material, × 300. **A** CKs 10 and 11 staining suprabasal layers. **B** CK 13 showing staining of suprabasal layers. **C** Staining of all layers for CK 18. Note intense staining reaction of individual squamous cells. **D** Intense staining of all layers with antibody to CK 19

In conclusion, our results suggest that the epidermoid splenic cyst is either of teratomatous derivation or originates from inclusions of fetal squamous epithelium. In view of the CK profile of the epithelium lining of this cyst, squamous metaplasia of mesothelium or inclusions of mature squamous epithelium appear to be unlikely sources of origin of epidermoid cysts of the spleen.

References

Bhaskaran CS, Rao G, Prasad KRK, Gunwani G (1991) Epidermoid cyst of the spleen – with unusual finding. A case report. Indian J Med Sci 45:88–90

Buerrig K (1988) Epithelial (true) splenic cysts. Pathogenesis of the mesothelial and so-called epidermoid cysts of the spleen. Am J Surg Pathol 12:275–281

Case RH, Gavin DF, Doohen DY(1971) Metaplastic mesodermal cyst of the spleen. Am Surg 37:97–102

Cremades Mira A, Vera-Sempere F, Perez Bacette M, Marin Serra J, Garcia Ballenter M, Llombart-Bosch A (1990) Quiste epidermoide esplenica estudio immunohistoquimico. An Esp Pediatr 33:185–88

Czernobilsky B, Lifschitz-Mercer B, Luzon A, Jacob N, Ben-Hur H, Gorbacz S, Fogel M (1989) Cytokeratin patterns in the epidermis of human ovarian mature cystic teratoma. Hum Pathol 20:185–192

Franke WW, Schmid E, Schiller DL, Winter S, Jarasch ED, Moll R, Denk H, Jackson BW, Illmensee K (1981) Differentiation-related patterns of expression of proteins of intermediate-sized filaments in tissues and cultured cells. Cold Spring Harb Symp Quant Biol 46:431–453

Gaudio M, Brizio R, Medri L, Marra GA, Padovani F, Vio A, Saragoni A (1989) Cisti epidermoidale della milza. Presentazione di un caso. Pathologica 82:465–470

Hsu SM, Raine L, Fanger H (1981) Use of avidin-biotin peroxidase complex (ABC) in immunoperoxidase techniques: a comparison between ABC and unlabelled antibody (PAP) procedure. J Histochem Cytochem 577–580

Lifschitz-Mercer B, Fogel M, Moll R, Jacob N, Kushnir I, Livoff A, Waldherr R, Franke WW, Czernobilsky B (1991) Intermediate filament profile of human testicular non-seminomatous germ cell tumours: correlation of cytokeratins, especially cytokeratin 19, to cellular differentiation. Differentiation 48:191–198

Miracco C, De Martino A, Botta R, Volterrani L, Luzi P (1986) Splenic cyst lined with mucus-secreting epithelium. Evidence of an intestinal origin. Arch Anat Cytol Pathol 34:304–305

Morinaga S, Ohyama R, Koizumi J (1992) Low-grade mucinous cystadenocarcinoma of the spleen. Am J Surg Pathol 16:903–908

Nerlich A, Permaretter W (1991) Fine needle aspiration. Cytodiagnosis of epidermoid cysts of the spleen. Report of two cases. Acta Cytol 35:567–569

Osborn M, Weber K (1983) Tumor diagnosis by intermediate filament typing. A novel tool for surgical pathology. Lab Invest 48:372–394

Ough YD, Nash ND, Wood DA (1981) Mesothelial cysts of the spleen with squamous metaplasia. Am J Clin Pathol 76:666–669

Panossian D, Wang N, Reeves CD, Weeks DA (1990) Epidermoid cyst of the spleen presenting as generalized peritonitis. Am Surg 56:295–298

Papke J, Radke EU (1990) Primäres malignes Teratom der Milz. Z Gesamte Inn Med 45:172–174

Robbins FG, Yellin AE, Lingua RW, Craig JR, Turrill FL, Mikkelsen WP (1978) Splenic epidermoid cysts. Ann Surg 187:231–235

Talerman A, Hart S (1970) Epithelial cysts of the spleen. Br J Surg 57:201–204

Tsakraklides V, Thomas WH (1973) Epidermoid cysts of the spleen. A report of five cases. Arch Pathol 96:251–254