CASE REPORT

Mucinous adenocarcinoma with superficial stromal invasion and villous adenoma of urachal remnants: a case report

R Mazzucchelli, M Scarpelli, R Montironi

J Clin Pathol 2003;56:465–467

This report describes a case of mucinous adenocarcinoma with superficial stromal invasion and villous adenoma originating in the dome of the urinary bladder. Although no urachal remnants were identified, the location suggested urachal derivation. Only two previous cases of urachal adenocarcinoma with features of early stromal invasion associated with a villous tumour have been described.

The urachus is a vestigial structure that connects the bladder to the allantois during early embryonic development. Postmortem studies have shown patent urachal remnants in the dome and anterior wall of the bladder in one third of cases.^{1,2} Histologically, urachal remnants consist of tubular structures and canals. The mucosal segment of the urachus may consist of a papilla, a small opening flush with the surface, a wide diverticular opening, or it may be absent. Urachal remnants are usually lined by transitional-type epithelium, but focal mucinous glandular metaplasia is often seen and may provide a morphological basis for the development of intestinal-type tumours.^{1,2}

"Malignant transformation of a urachal villous adenoma is a possible mechanism for the histogenesis of primary adenocarcinoma of the bladder"

Villous adenoma is rarely found outside the large bowel, and villous glandular neoplasms are uncommon in the urinary bladder.^{3–9} Urachal villous adenoma is very rare. In the report by Eble *et al.*,⁷ 16 cases were identified in the literature published up to 1986. Stenhouse and colleagues¹⁰ and Paul and colleagues¹¹ reported two cases of urachal mucinous adenocarcinoma in situ. Two cases of villous adenoma associated with features of early invasion were reported by Assor³ and Lucas *et al.*¹² Malignant transformation of a urachal villous adenoma is a possible mechanism for the histogenesis of primary adenocarcinoma of the bladder.

We present a case of colonic-type villous adenoma with adjacent features of early invasive mucinous adenocarcinoma originating in the urinary bladder dome.

CASE REPORT

A 75 year old man presented with complaints of passage of mucous in his urine (mucosuria). Excretory urography showed a filling defect near the dome of the bladder. Cystoscopic examination disclosed a mass with a crater-like opening in its centre from which mucous was streaming into the bladder lumen. An abdominal computed tomography scan revealed a 4 cm mass protruding through the anterosuperior bladder wall. The mass did not appear to involve adjacent

Figure 1 Macroscopic appearance of the resected specimen.

structures. The patient underwent excision of the mass. This included the perivesical adipose tissue. The peritoneal surface of the lesions was accidentally discontinued during tumour removal.

The patient was seen for complaints of abdominal pain one year after the first operation. Laparoscopy revealed scattered mucinous peritoneal implants, which were removed. No abnormalities were seen on the peritoneal surface of the appendix.

The patient presented again with mucosuria two years after the operation. At cystoscopy, there was evidence of tumour recurrence in the mucosal surface adjacent to the site of the previous surgical excision. Transurethral resection of

Figure 2 Whole mount preparation of the resected specimen. The lesion present on the mucosal surface and in the underlying duct is composed of delicate papillary fronds. (A) Colonic-type villous adenoma with both low and high grade features of dysplasia. (B) Mucinous adenocarcinoma with superficial stromal invasion. (C) Flat carpet of intestinal-type columnar epithelium with some pseudostratification and crowded nuclei.

the lesion was performed. At the time of writing this report (three years after the first operation) the patient is clinically well.

MATERIALS AND METHODS

The surgical material was fixed in 10% neutral buffered formalin for 24 hours. The entire specimen was then processed with a whole mount technique. Serial 5 µm thick sections from multiple paraffin wax blocks were stained with haematoxylin and eosin, mucicarmine, periodic acid Schiff with and without diastase, and with monoclonal antibodies directed against carcinoembryonic antigen. The avidin–biotin peroxidase technique was used.

Pathological examination

Gross pathology

Figure 1 (gross specimen) and fig 2 (haematoxylin and eosin stained whole mount section) show the macroscopic appearance of the lesions on the cut surface of the bisected specimen. A 2 cm lesion was seen protruding from the mucosal surface (fig 2; black arrow). This consisted of many delicate papillary fronds. A rim of normal appearing mucosa was seldom

present at the periphery of the lesion. A 1 cm long canal connected the mucosal mass with a cyst located within the bladder wall. The cyst showed fairly well demarcated borders. Tenacious clear mucous was focally adherent to the inner surface where the contour was slightly irregular (fig 2; brown arrow).

Light microscopy and immunohistochemistry

The lesion protruding from the mucosal surface resembled colonic villous adenoma with features of dysplasia of low and high grade (fig 2A; black arrow). Intracellular and extracellular mucin was seen. An identical lesion was present in the canal. The wall of the cyst was composed of a thin rim of fibrous tissue with scattered smooth muscle cells. Most of the inner surface of this cyst was lined by a flat carpet of normal looking intestinal-type columnar epithelium that stained strongly for both acid and neutral mucins. Mucinous adenocarcinoma (fig 2B) was present in the area of the cyst wall indicated by the brown arrow. The depth of the neoplastic infiltration of the cyst wall was consistent with superficial stromal invasion. The columnar epithelium in close proximity to the adenocarcinoma showed some pseudostratification,

crowded nuclei, and less mucous (fig 2C; green arrow). An abrupt transition between the villous adenoma present in the canal and the mucinous adenocarcinoma was noted. Although no urachal remnants were identified, the location suggested urachal derivation.

Immunoperoxidase staining for carcinoembryonic antigen was strongly positive in the cytoplasm and luminal border of the cells present in areas of villous adenoma with high grade features and in the mucinous adenocarcinoma. The low grade component of the villous adenoma and the columnar epithelium remote from the invasive tumour were negative.

The peritoneal implants consisted of deposits of extracellular mucin adherent to the serosa, containing inflammatory and mesothelial cells and organising capillaries. Scattered isolated epithelial cells were present. The recurrent lesion showed the morphology of a villous adenoma and was identical to that seen on the mucosal surface of the first resection.

DISCUSSION

Primary adenocarcinoma of the bladder is rare, accounting for only 2% or less of malignant bladder tumours.^{3 4 7-9 13} It may show a variety of histopathological glandular patterns,¹³⁻¹⁵ but is often mucin secreting, and may present with mucusuria. There are two commonly proposed mechanisms for the development of primary bladder adenocarcinoma. One involves the malignant transformation of metaplastic intestinal-type epithelium associated with a condition known as cystitis glandularis. Such tumours are located most commonly in the vicinity of the trigone. The second mechanism invokes neoplastic transformation of the glandular epithelium lining the intravesical portion of the urachal remnants. Accordingly, this neoplasm is usually found in the dome and anterior wall of the bladder. Either of the two proposed mechanisms may give rise to a villous adenoma similar to that of the colon.^{3 4 7-9} In addition, both non-invasive and invasive adenocarcinomas arising in association with villous adenoma attest to the malignant potential of adenoma. Here, we present morphological evidence that malignant transformation of villous adenoma, an accepted mechanism for the development of adenocarcinoma of the colon, accounts for the histogenesis of some primary adenocarcinomas of the bladder.

In general, the prognosis of such cases, including villous adenoma, is very good. However, it may depend on the presence of peritoneal implants and on the resection margin status.

"Urinary mucous is a common and relatively specific symptom for adenomas of the lower urachus"

Resection alone is effective treatment but care must be exercised to avoid spilling adenoma/carcinoma cells in the peritoneum and to remove the lesion with ample free margins. Our patient showed peritoneal implants. This was probably because the peritoneal surface of the lesions was accidentally discontinued during tumour removal. Stenhouse *et al* described a case with pseudomyxoma peritonei associated with urachal adenocarcinoma in situ.¹⁰ According to these authors the patient's morbidity and prognosis will probably be determined by the peritoneal implants. These were also seen in the patient reported by DeKortè.¹⁶ The patient died with numerous mucinous peritoneal implants three years after presentation. Local recurrence was not reported in the earlier series,^{3 7 12} but was seen in our patient because of incomplete resection of the lesion.

Urinary mucous is a common and relatively specific symptom for adenomas of the lower urachus.⁷ This symptom was reported in seven of 11 symptomatic patients in whom the

Take home messages

- We believe that this is only the third patient with urachal adenocarcinoma with features of early stromal invasion and associated with a villous tumour to be described
- We identified a morphological transition from mucinous epithelium and villous adenoma to invasive adenocarcinoma originating from the urachal remnants in our patient

adenoma involved the lower portion of the urachus.⁷ The other reported symptoms, including haematuria, pain, and urinary frequency and mass, are common to many bladder diseases.

In conclusion, a morphological transition from mucinous epithelium and villous adenoma to invasive adenocarcinoma originating from the urachal remnants was identified in our patient. To the best of our knowledge, only two previous cases of early stromal invasion associated with a villous tumour in the dome of the bladder have been described.^{3 12}

ACKNOWLEDGEMENTS

This publication has been supported by a research grant from the Italian Ministry of University and Scientific Research (RM) (grant: MUIR; year 2001).

Authors' affiliations

R Mazzucchelli, M Scarpelli, R Montironi, Institute of Pathological Anatomy and Histopathology, Ancona University School of Medicine, 60020 Torrette, Ancona, Italy

Correspondence to: Professor R Montironi, Institute of Pathological Anatomy and Histopathology, School of Medicine, University of Ancona, Azienda Ospedaliera Umberto I°, 60020 Torrette, Ancona, Italy; r.montironi@popcsi.unian.it

Accepted for publication 25 January 2003

REFERENCES

- 1 Begg RC. The urachus: its anatomy, histology, and development. *J Anat* 1930;**64**:170.
- 2 Schubert GE, Pavkovic MB, Bethke-Bedurftig BA. Tubular urachal remnants in adult bladders. *J Urol* 1981;**127**:40-42.
- 3 Assor D. A villous tumor of the bladder. *J Urol* 1978;**119**:287-8.
- 4 Channer JL, Williams JL, Henry L. Villous adenoma of the bladder. *J Clin Pathol* 1993;**46**:450-2.
- 5 Cheng L, Montironi R, Bostwick DG. Villous adenoma of the urinary tract: a report of 23 cases, including 8 with coexistent adenocarcinoma. *Am J Surg Pathol* 1999;**23**:764-71.
- 6 Daroca PJ, MacKenzie F, Reed RJ, *et al*. Primary adenovillous carcinoma of the bladder. *J Urol* 1976;**115**:41-5.
- 7 Eble JN, Hull MT, Rowland RG, *et al*. Villous adenoma of the urachus with mucusuria: a light and electron microscopic study. *J Urol* 1986;**135**:1240-4.
- 8 Miller DC, Gang DL, Garvis V, *et al*. Villous adenoma of the urinary bladder: a morphologic or biological entity? *Am J Clin Pathol* 1983;**79**:728-31.
- 9 O'Brien AME, Urbanski SJ. Papillary adenocarcinoma in situ of the bladder. *J Urol* 1985;**134**:544-6.
- 10 Stenhouse G, McRae D, Pollak AM. Urachal adenocarcinoma in situ with pseudomyxoma peritonei: a case report. *J Clin Pathol* 2003;**56**:152-4.
- 11 Paul AB, Hunt CR, Harney JM, *et al*. Stage 0 mucinous adenocarcinoma in situ of the urachus. *J Clin Pathol* 1998;**51**:483-4.
- 12 Lucas DR, Lawrence WD, McDevitt WJ, *et al*. Mucinous papillary adenocarcinoma of the bladder arising within a villous adenoma of urachal remnants. An immunohistochemical and ultrastructural study. *J Urol Pathol* 1994;**2**:173-82.
- 13 Anderstrom C, Johansson SL, Schultz LV. Primary adenocarcinoma of the urinary bladder. *Cancer* 1983;**52**:1273-80.
- 14 Abenoza P, Manivel C, Fraley EE. Primary adenocarcinoma of the urinary bladder. *Urology* 1987;**1**:9-14.
- 15 Grignon DJ, Ro JY, Ayala AG, *et al*. Primary adenocarcinoma of the urinary bladder. *Cancer* 1991;**67**:2165-72.
- 16 DeKortè WE. An adenoma of the bladder. *J Pathol Bacteriol* 1919;**22**:319.