Elevated α-fetoprotein levels in a woman with ovarian teratoma

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INTRODUCTION

This article reports a young woman who was a hepatitis B carrier with persistent abnormal liver function and who was accidentally found to have elevated serum α-fetoprotein (AFP) levels (>1000 μg/litre). Hepatoma was suspected, but a relatively common and benign mature cystic ovarian teratoma was finally diagnosed. Elevated AFP levels have been reported in mixed germ cell tumours and pure endodermal sinus tumours (yolk sac tumour) of the ovary (Bonazzi et al, 1989; Kawai et al, 1992; Piura et al, 1995), but no reports have yet mentioned AFP elevation in benign cystic teratomas (Kawai et al, 1992). Thus, the role of AFP is worthy of more attention.

DISCUSSION

A teratoma is also called a 'dermoid cyst', yet the more correct classification nomenclature by Peterson (1957) is:

1. Benign cystic teratoma – a benign cyst containing derivatives of two or more germ layers with differentiation and maturity of tissue elements
2. Malignant teratoma – a predominantly solid tumour frequently containing cystic structure which is malignant as evidenced by immaturity and lack of differentiation of its tissue elements
3. Carcinoma – sarcoma arising in a benign cystic teratoma.

Eighty five per cent of mature cystic teratomas occur in women aged 16–55 years, and approximately one half of mature cystic teratomas measure 5–10 cm in diameter (Commerci et al, 1994). They are often discovered as an incidental finding of a physical examination, imaging procedure or abdominal or pelvic surgery performed for other indications. A significant portion of patients (65%) are asymptomatic (Commerci et al, 1994). When symptoms are present, they usually consist of abdominal pain, abdominal mass or swelling and abnormal uterine bleeding (Peterson et al, 1955). Torsion is the most common complication (Pantoja et al, 1975).

AFP is synthesized by the embryonic liver and is the major glycoprotein found in fetal serum. It resembles albumin in molecular weight, amino acid sequence and immunological characteristics. However, it is not normally detectable after birth. Ordinarily, high levels of fetoproteins are found in the developing fetus, whereas low levels exist in maternal serum and amniotic fluid.

AFP is useful as a tumour marker as well as to detect other conditions (*Table 1*). It was also found to be a useful tumour marker for the diagnosis and management of malignant germ cell tumours of the ovary (Bonazzi et al, 1989; Kawai et al, 1990, 1992). It has been reported that pure immature teratomas (malignant germ cell ovarian tumours) can produce measurable amounts of AFP (Bonazzi et al, 1994). AFP levels usually normalize within 4 weeks of surgical removal (Kawai et al, 1990). Elevated AFP levels have also been reported in mixed germ cell tumours and pure endodermal sinus tumours (yolk sac tumour) of the ovary (Bonazzi et al, 1989; Kawai et al, 1992; Piura et al, 1995). The AFP levels found in pure endodermal sinus tumours often exceed 1000 μg/litre compared with less than 1000 μg/litre in immature teratomas (Kawai et al, 1992), but they are all rare and lethal malignant tumours of the ovary. No reports have yet mentioned elevated AFP levels in benign cystic teratomas (Kawai et al, 1992).

CASE REPORT

A 28-year-old single woman, who was a chronic hepatitis B carrier, had been healthy except for an acute hepatitis episode 9 months before admission. Since then, she was regularly followed up at the authors' clinic, but abnormal liver function persisted. However, serum α-fetoprotein (AFP) levels were within normal limits (<10mg/litre) during this period until a visit, 2 months before admission, when AFP levels suddenly elevated to 1100mg/litre. Abdominal sonogram only revealed parenchymal liver disease. The appearance was of infiltrating hepatocellular carcinoma, and a computed tomography scan was performed which showed a well-encapsulated 11x10x9cm tumour mass with fat and calcified content in her pelvic cavity. Therefore, she was admitted for exploratory laparotomy.

She denied having had sexual intercourse, and her menstruation cycle had been regular. She had neither experienced low abdominal pain nor noticed a palpable mass. She was neither anaemic nor icteric. Laboratory findings at admission included a normal complete blood count, total bilirubin 71.8 μmol/litre (normal <17 μmol/litre), aspartate transaminase (AST) 601 U/litre (normal=10–40 U/litre) and alaninine transaminase (ALT) 755 U/litre (normal=5–40 U/litre). AFP level was 1500 μg/litre.

The patient underwent an exploratory laparotomy. A large pelvic mass (*Figure 1*) arising from the right ovary was found. It did not adhere to the pelvic wall or peritoneum. The uterus and left ovary appeared grossly normal. Pelvic lymph nodes seemed normal. Right salpingo-oophorectomy was performed. The pathological report was mature cystic teratoma (*Figure 2*). Cytology was negative for malignant cells. Her postoperative course was unremarkable.

Two weeks after her discharge, her AFP level fell to 47 μg/litre. Two months later, AFP further dropped to 11 μg/litre. Interestingly, ALT and AST level also became normal. She remains well and keeps coming to follow-up clinics. Her AFP level has been within normal range, with a slightly raised liver function (still in hepatitis B carrier state) during the last few checkups.

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Figure 1. A 10 cm diameter well-encapsulated cystic teratoma with a tooth and hair seen on its capsule.

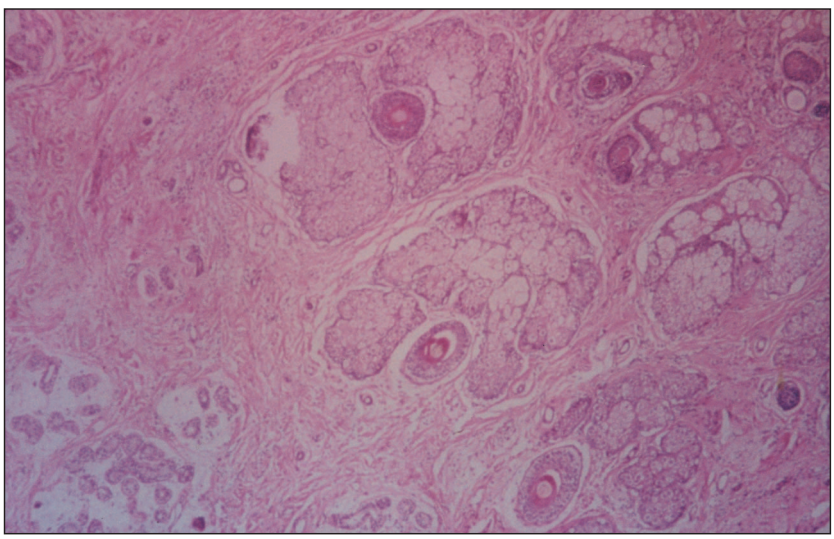

Figure 2. There were epidermis and structures such as connective tissue, sebaceous glands, sweat glands and hair follicles seen in normal skin dermis.

TABLE 1.
Conditions in which α-fetoprotein is a marker

Type of cancer	Primary hepatocellular cancer
	Embryonal cell testicular tumour
	Yolk sac ovarian tumour
	Teratocarcinoma
	Gastric, pancreatic, colonic, breast, renal and lung cancers
Conditions other than cancer	Fetal distress and death
	Neural tube defects
	Viral hepatitis
	Primary biliary cirrhosis
	Ataxic-telangiectasia
	Multiple pregnancy and abortion

This patient is a chronic hepatitis B carrier with persistent abnormal liver function, so that such a high AFP level could easily lead to the consideration of the possibility of liver neoplasms. She is a single female, with no history of sexual intercourse and no abdominal pain. The ovarian tumour was an accidental finding. Although the tumour seemed unlikely to produce such a high AFP level, a correlation was evident between AFP level and her ovarian tumour since it dropped to near normal after surgery. However, the normalization of AST and ALT remains difficult to explain.

CONCLUSION

As family physicians in Taiwan, we often face hepatitis B carrier patients asking for follow-up. Although hepatitis B infection and hepatoma are prevalent in Taiwan, other conditions causing AFP elevation should be sought, especially in female patients. High levels of AFP in a benign ovarian tumour as seen in this patient are rare. However, malignant ovarian tumours should never be overlooked. HM

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