A giant uterine leiomyoma simulating an ovarian mass in a 16-year-old girl: a case report and review of the literature

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Summary

Uterine leiomyomas are extremely rare neoplasms in the pediatric and adolescent population. We report a case of a giant uterine leiomyoma measuring 30 cm in the largest diameter in a 16-year-old girl. To our knowledge this is the largest leiomyoma reported thus far in women under the age of 20 years. The patient was admitted to our hospital for the investigation of menstrual disorders, vaginal bleeding and progressive abdominal enlargement. Preoperative diagnosis was ovarian malignancy. Myomectomy was performed. Histopathologic study of the tumor showed an otherwise typical leiomyoma, both grossly and microscopically, with extensive hydropic and myxomatous degeneration and areas of prominent vessels, suggesting an angiomatous neoplasm. Leiomyomas in teenagers often exhibit histological features favoring the diagnosis of malignancy, and should be evaluated with extreme caution. The management of leiomyomas in these young patients should be conservative for the preservation of fertility.

Key words: Leiomyomas; Adolescents; Estrogens; Sarcoma.

Introduction

Uterine leiomyomas are the most common neoplasms of the female genital tract, with an overall incidence of 4-11% and an incidence of 40% in women over the age of 50 years [1-2]. However, they are only sporadically reported in women under the age of 20 years [2-3]. We report a case of a uterine leiomyoma, measuring 30 cm in the largest diameter, making it the largest – to our knowledge – uterine leiomyoma reported thus far in a teenager. The clinical, ultrasonographic and radiological findings are presented.

Case presentation

A 16-year-old girl was admitted to our hospital for the investigation of the following symptoms which had lasted six months: menstrual disorders (increased frequency and duration of menstrual flow), vaginal bleeding and progressive abdominal enlargement. The patient's menstrual history until the onset of symptoms had been completely normal. Menarche occurred at the age of twelve and a half and menses had been regular ever since. The possibility of pregnancy was excluded after a negative pregnancy test. The personal history of the patient was free of important diseases, while the family history revealed that her grandmother had undergone myomectomy for multiple uterine leiomyomas at an age between 40-50 years old (inadequate clinical information). On physical examination the abdomen was found to be occupied almost completely by a palpable, painless mass. Laboratory tests showed significant anemia – hematocrit (Hct): 31.2%, hemoglobin (Hgb): 9.9g/dl. Serum levels of estradiol, progesterone, total testosterone, free testosterone and sex hormone binding globulin were found within normal limits. Pelvic examination was suggestive of an ovarian tumor, thus additional ultrasonographic and radiological investigations were carried out. Ultrasonography (US) showed a large, mostly solid, mass measuring 18 x 20 x 24 cm, which seemed to arise from the left ovary. On the contrary, computed tomography (CT) showed that the mass was predominantly cystic. Both on US and CT the mass was seen filling the pelvis and the anterior abdomen, and extending up to the level of the lower liver margin (Figure 1). Preoperative diagnosis was ovarian malignancy. The patient was submitted to laparotomy and the tumor was found connected to the uterus and was removed intact. Both ovaries appeared normal during the procedure. On gross examination the tumor appeared as a firm, white, well circumscribed neoplasm, measuring 30 x 23 x 10 cm, with a focal microcystic appearance on cut section, and larger cystic spaces filled with myxomatous content. There were no areas of softening of hemorrhage. Microscopic examination showed the typical features of a leiomyoma: interlacing bundles of spindle-shaped smooth muscle cells without any cytologic atypia, mitotic activity or necrosis (Figure 2). The background of the lesion consisted mainly of moderately eosinophilic myxomatous material, few cellular elements which were immunoreactive for actin, desmin and vimentin, and were therefore considered of smooth muscle origin. A rich vascular network was also present (Figure 3). The final diag-

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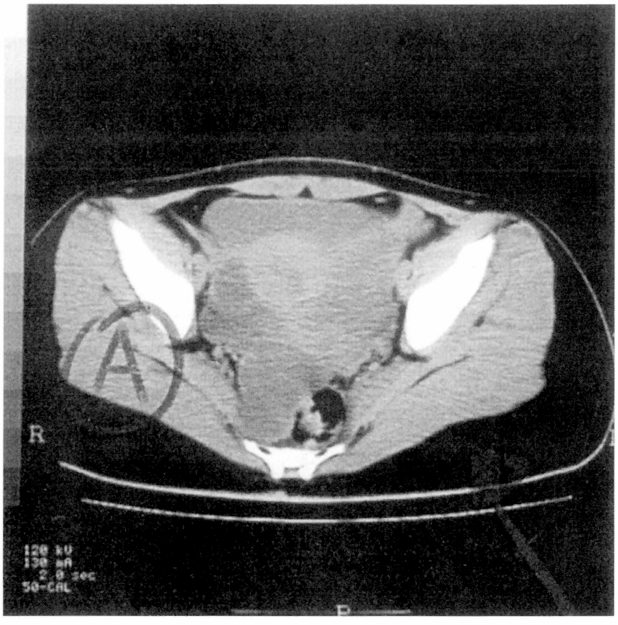

Figure 1. — Contrast-enhanced CT of the pelvis shows a large multilocular predominantly cystic mass with a few enhancing solid elements.

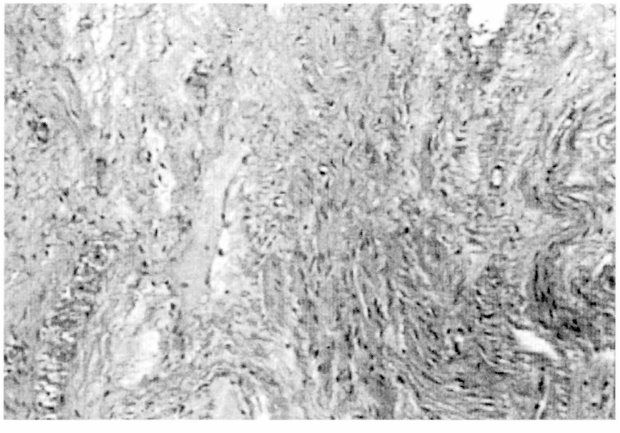

Figure 2. — Histological section of the tumor presenting a typical leiomyomatous area (hematoxylin-eosin x 100).

nosis was leiomyoma, measuring 30 cm in the largest diameter, with extensive hydropic and myxomatous degeneration.

The patient remains free of relapse six years following the operation.

Discussion

Uterine leiomyomas are benign, mesenchymal tumors which arise within the smooth muscle of the myometrium [4]. They typically occur in women of reproductive age, mainly between the ages of 35 and 50 years old, while they are extremely uncommon in the pediatric and adolescent population (2). In a recent series of 2,187 myomectomies, less than 0.4% of patients were teenagers [5].

The diagnosis of leiomyomas is mainly based on routine pelvic examination and only rarely on clinical symptomatology, since most leiomyomas remain asymptomatic [4]. The occurrence and nature of leiomyoma-related symptoms, such as abnormal bleeding, dysmenorhea, pelvic or abdominal pain, are mainly related to the size of the tumor and its location [1, 6]. Subserosal leiomyomas normally do not produce any symptoms, while submucosal and intramural leiomyomas may result in metrorrhagia or menorrhagia, correspondingly, whose severity usually depends on the tumor size [1, 2, 3].

The extremely high incidence of leiomyomas renders them the most thoroughly studied neoplasms of the female genital tract. However, their etiology remains unknown [2, 6, 7]. There is strong clinical evidence of a hormone (steroid) dependence of these tumors because of their observed shrinkage after menopause and enlargement during pregnancy or after administration of progestational agents, or administration of the ovulation-inducing agent clomiphene [7]. In addition, leiomyoma cells invariably express estrogen and progesterone receptors, and higher levels of estrogen receptors have been found in the normal myometrium of leiomyomatous uteri [1, 8].

In our review of the English literature less than ten cases of leiomyomas have been reported in adolescents. A review of these reports reveals that in all cases a solitary, relatively large tumor was present, with a size ranging from 7 to 26 cm (mean size 15.33 cm) [2]. In addition, all of these tumors were accompanied by symptoms of uncommon severity which included profuse bleeding resulting in severe anemia. Among the previous reports, there is an exceptional case of a 15-year-old girl that was submitted to emergency laparotomy for the removal of a rapidly growing fibroid because of an intraabdominal hemorrhage caused by a ruptured vessel [9]. Our case of a uterine leiomyoma in a teenager is the largest reported – to our knowledge – thus far, which also presented with severe symptomatology. What was also of special interest in our case was the fact that the tumor simulated clinically, ultrasonographically and radiologically an ovarian malignancy. This observation indicates the need for extreme caution in the preoperative evaluation of pelvic neoplasms, especially when they are of a

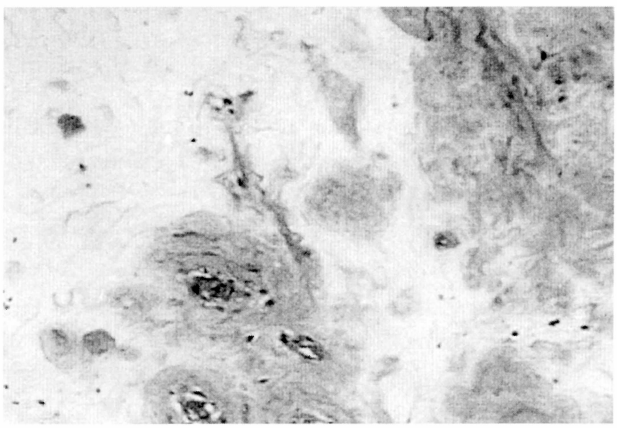

Figure 3. — Histological section of the tumor showing areas of myxoid cystic degeneration (hematoxylin-eosin x 100).

large size. Intraoperative evaluation and performance of a frozen section may be necessary not only for the exclusion of a malignancy but also for the determination of the origin of such a neoplasm.

In view of the fact that leiomyomas typically enlarge after menarche [7], the large size of a leiomyoma in a teenager most likely indicates rapid growth of the tumor. This rapid enlargement has been previously associated with hormonal effects, either endogenous (pregnancy, obesity) or exogenous, on the basis of a hormone-dependent pathogenetic mechanism, as mentioned previously [2, 6]. However, pregnancy (and obesity) was excluded in our case, and there was no history of administration of pharmaceutical agents or evidence suggestive of any endogenous hormonal alterations. Pathologic examination of the tumor revealed the presence of extensive hydropic and myxomatous degeneration. Cystic degeneration of a leiomyoma in a teenager has been previously reported [10], however, the presence or the type of these degenerative changes does not seem to have any impact on prognosis or therapy, or to be specifically associated with the period of adolescence.

Besides rapid growth, other histological features favoring the diagnosis of a malignancy (increased cellularity and mitotic activity, cellular atypia) were found in a significant percentage (50%) of the previously reported cases of leiomyomas in teenagers [2]. The underlying cause of this apparently high frequency of atypical leiomyomas in this age group, and especially in those cases not associated with pregnancy, is unknown. A rather daring hypothesis could be that the stimulating hormonal milieu of early adolescence might trigger both rapid growth and atypical changes of preexisting leiomyomas. According to recent reports, mesenchymal (vascular) neoplasms tend to grow rapidly during pregnancy and in adolescent females, with a suspected involvement of estrogens [11]. In addition, vascular abnormalities have been identified in the myomatous uterus, and angiogenesis has been implicated both in leiomyoma growth and leiomyoma-related bleeding [12]. On the basis of this theory, the occurrence of profuse bleeding in all cases of adolescents with leiomyomas reported so far may suggest the presence of vascular dysregulation. In our case, prominent vessels were observed as well, suggesting focally an angiomatous neoplasm.

On the contrary, such an early formation of a leiomyoma could also be etiologically linked to a genetic mechanism. Indeed, there is strong evidence, both clinical and laboratory, including twin-pair and cytogenetic studies, of a familial predisposition to leiomyomas [13]. A familial history of leiomyomas was also present in our case.

The management of teenagers with leiomyomas should, in all cases, be conservative for the preservation of fertility [3]. Although the ideal type of therapy, whether surgical (myomectomy), pharmaceutical, or other (i.e. uterine artery embolization) remains a matter of debate and depends on the size, the location of the tumor, the presence and severity of symptoms and the coexistence or planning of a pregnancy, it seems that in most cases surgical excision of the mass is the treatment of choice [2, 3].

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