Skeletal Radiology (2019) 48:461–465
https://doi.org/10.1007/s00256-018-3041-2

CASE REPORT

Case report: urinoma in the proximal thigh mimicking a soft tissue neoplasm

Christopher Schuppert[1] · Christoph Rehnitz[1] · Carine Pecqueux[2] · Michaela Angelescu[3] · Christopher L. Schlett[1]

Received: 8 May 2018 / Revised: 28 July 2018 / Accepted: 31 July 2018 / Published online: 22 August 2018

Abstract
Soft tissue tumors form a heterogeneous group of benign and malignant lesions. Those with a high fluid content may be particularly challenging in diagnosis. We present a 78-year-old man with a dolorous, progressive mass in the adductor region of the lower left extremity. At the end of a long diagnostic pathway, the pseudocystic tumor was eventually identified as a urinoma, caused by a prostatosymphyseal fistula that had occurred as a late complication of transurethral resection of the prostate. Our finding represents a rare variant of soft tissue tumors in the lower extremities, which MR-based urography can help to reveal.

Keywords Tumor · Myxoid · Urinoma · TURP · PSF · Complication · MR urography

Introduction

As with most tumors, soft tissue masses may be histologically divided into three major categories: non-neoplastic as well as benign or malignant (or intermediate grade) neoplastic. Non-neoplastic tumors form a heterogeneous group, with frequent examples ranging from traumatic observations such as hematoma, over infectious conditions such as abscesses, to synovial anomalies such as ganglion cysts. Benign soft tissue tumors are a relatively common occurrence in adults, of which at least one-third are lipomas and another third are fibrohistiocytic or fibrous tumors [1]. Malignant soft tissue tumors (i.e., soft tissue sarcomas) make up only about 1% of all soft tissue tumors—statistics vary but generally include undifferentiated pleomorphic sarcoma, liposarcoma, and leiomyosarcoma among the most common occurrences in adults [1–4]. For malignant soft tissue tumors, the likelihood of occurrence increases with age and has a median of 65 years [1]. Besides past medical history and clinical examination, MRI is the most favorable non-invasive diagnostic tool for determining the tumor entity.

Case report

A 78-year-old man presented with a 6-month history of burning discomfort in the right groin and proximal medial thigh accompanied by a gradually progressive swelling of the adductor region. Examination showed a hand-sized tender mass in the right adductor region. No palpable inguinal lymphadenopathy, warmth, or erythema were detected. The femoral pulse was well felt. There was no restriction of movement in the adjacent joints. Further musculoskeletal examination as well as general physical examination were unremarkable. The laboratory workup was unremarkable. Past medical history included benign prostatic hyperplasia with two-time transurethral resection (TURP; 15 months as well as 11 years before recent presentation) and diuretic medication. No recent trauma or major injury had been reported.

At the initial presentation, ultrasound examination showed a hypoechogenic, polycystic, septated mass of approximately 8.0 × 6.5 × 3.5 cm in the medial compartment of the right thigh. Plain radiographs of the right upper leg showed no skeletal alterations except for mild degenerative changes of the hip joint. For further work-up, contrast-enhanced MRI was ordered.

✉ Christopher L. Schlett
christopher.schlett@med.uni-heidelberg.de

[1] Department of Diagnostic and Interventional Radiology, Heidelberg University Hospital, Im Neuenheimer Feld 110, 69120 Heidelberg, Germany

[2] Department of Urology, Heidelberg University Hospital, Heidelberg, Germany

[3] Department of General, Visceral and Transplantation Surgery, Heidelberg University Hospital, Heidelberg, Germany

Demonstrating the known large mass, the MRI revealed its full proximodistal extent of 16 cm, located in between the Mm. pectineus, adductor magnus, adductor longus, and adductor brevis with focal penetration of the proximal fascia into the subcutaneous fatty tissue. It consisted primarily of cystic T2w-hyperintense (without fat suppression) and native T1w-hypointense portions (Fig. 1a, b). After administration of contrast agent, inhomogeneous contrast enhancement mainly of the rim and septa was observed (Fig. 1c). Diffusion-weighted images showed restricted diffusion along the septa. Additionally, parasymphyseal bone marrow edema was evident. The patient was given the suspected differential diagnosis of soft tissue sarcoma, including, e.g., myxoid liposarcoma or lymphangiosarcoma. An alternative diagnosis of abscess formation was discussed, but deemed less likely due to only mild clinical symptoms and no recent interventions. Additionally ordered thoracic CT staging did not reveal distant metastases.

Open biopsy was performed to confirm the diagnosis. Enclosed by a gray soft tissue capsule, a large amount of brownish fluid without pus was drained. Histologic and immunohistochemical analysis did not yield proof of benign or malignant neoplasm. Infectious/parasitic origination was discussed by the pathologist due to extensive tissue eosinophilia, but no microorganisms could be isolated at the time.

Follow-up MRI covering the pelvis and the right thigh was performed 6 weeks after the initial MRI and 5 weeks after biopsy to serve as planning for operative resection. It demonstrated no major change of the polycystic, septated mass besides minor post-operative changes. Further, the parasymphyseal bone marrow edema persisted with a minor fluid collection in the interpubic gap (Fig. 2). In standard post-contrast sequences, inhomogeneous enhancement of the mass's rim and septa was observed as before (Fig. 3a, b). Additional very delayed-phase image series were acquired approximately 90 min after gadolinium injection to serve as contrast-enhanced MR-urography. These showed new contrast enhancement within the joint gap of the pubic symphysis as well as the cystic regions of the mass, suggesting

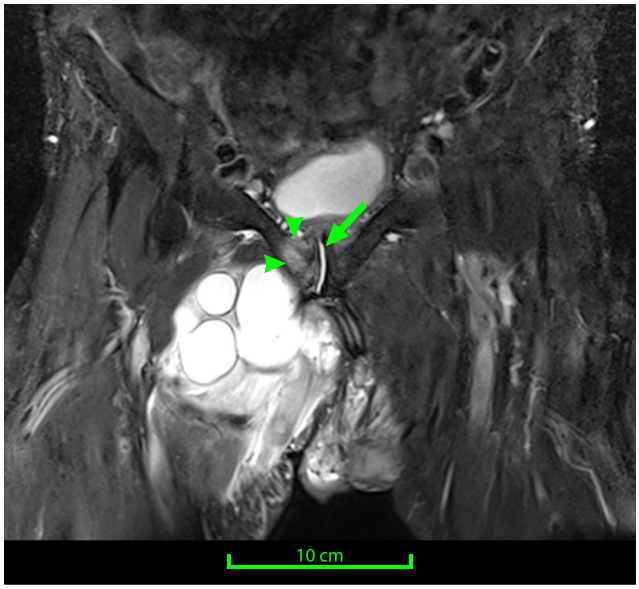

Fig. 2 Follow-up MRI 6 weeks after the initial MRI and 5 weeks after biopsy demonstrates persistent parasymphyseal bone marrow edema (*arrowheads*) and a fluid-collection in the interpubic gap (*arrow*; coronal STIR)

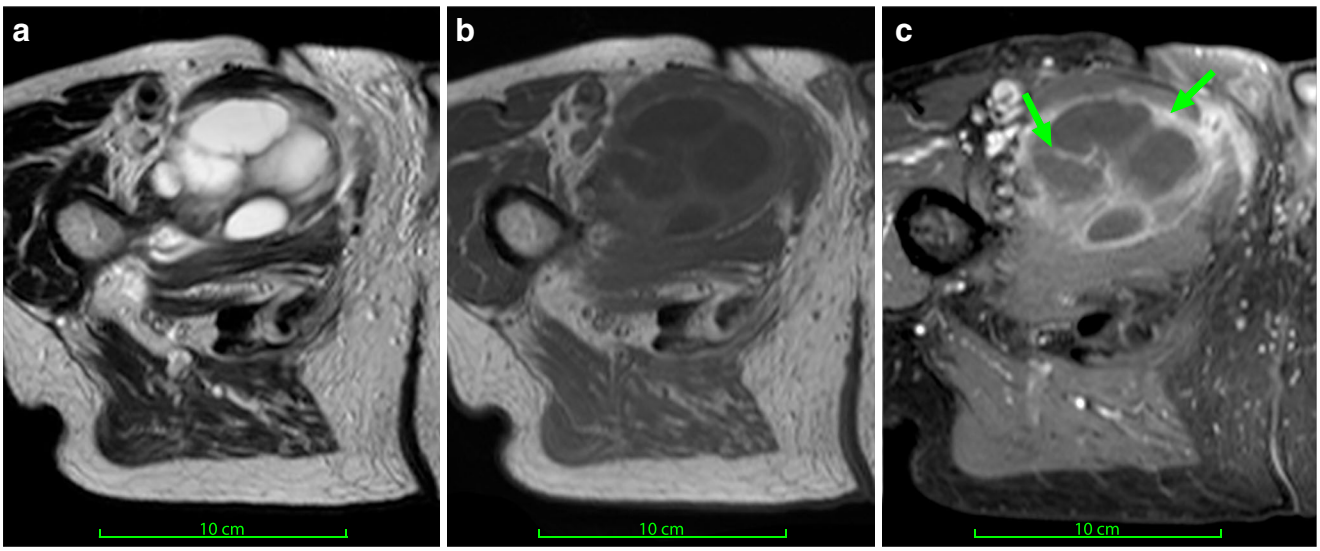

Fig. 1 A 78-year-old male with a gradually progressive swelling of the right medial thigh. The first MRI scan shows the tumor mass in the proximal adductorial region. The predominantly cystic architecture generates a T2w-hyperintense (axial T2 TSE; **a**) and native T1w-hypointense signal (axial T1 TSE pre-contrast; **b**). Post-contrast images display inhomogeneous contrast enhancement mainly of the rim and septa (*arrows*) about 2 min after contrast agent administration (axial T1 TSE FS post-contrast; **c**)

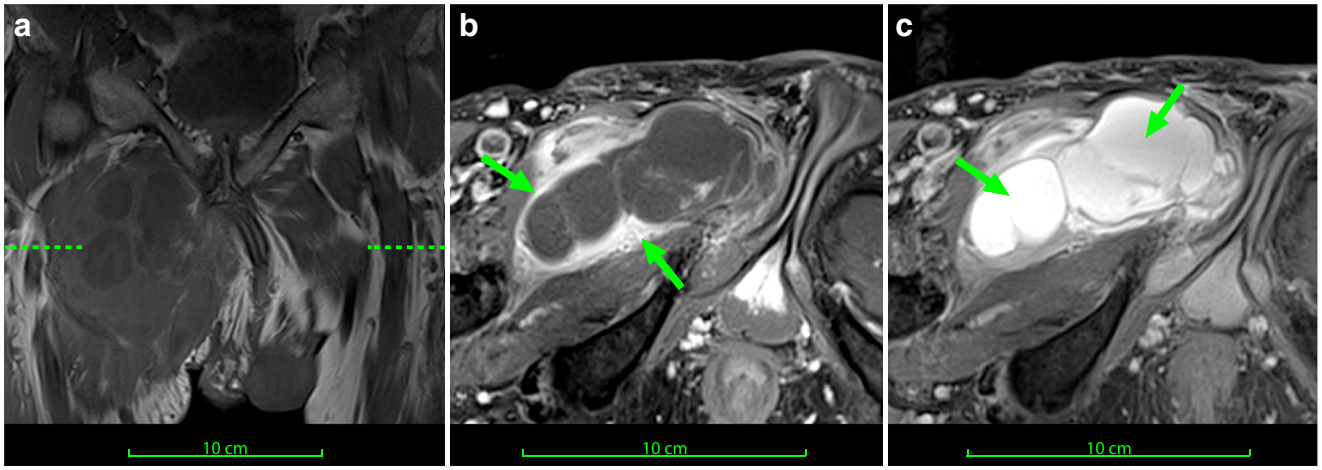

Fig. 3 Follow-up MRI shows inhomogeneous enhancement of the rim and septa as before (*arrows*; coronal T1 TSE FS pre-contrast; **a** and axial T1 TSE FS post-contrast; **b**). Very delayed-phase image series acquired 90 min after contrast media injection demonstrate extensive contrast enhancement within the cystic regions of the mass (*arrows*; axial T1 TSE FS delayed post-contrast; **c**). The *dashed lines* refer to the position of the axial images

communication with the urinary collecting system (Figs. 3c and 5b). This finding was further backed up by flow-void artifacts between the symphysis and the adjoining marginal area of the lesion in T2-weighted MR urography (Fig. 4). The soft tissue separation between the bladder basis and the pubic symphysis was partially missing (Fig. 5a). Finally, the parasymphyseal bone marrow edema now exhibited contrast enhancement (Fig. 5b). The differential diagnosis was revised to prostatosymphyseal fistula (PSF) with osteomyelitis pubis and large urinoma in the adductor canal as a post-operative complication following two-time TURP (most recently 15 months prior to initial presentation).

The patient was referred to his urologist for analysis of urea, uric acid, creatinine, and nitrate concentrations within the liquid mass, confirming the diagnosis. Following a failed conservative treatment attempt, he underwent open radical prostatectomy with urethral reconstruction as well as extirpation of the urinoma 2 months after the biopsy. The urinoma showed signs of superinfection at the time of surgery. The patient could be transferred to a rehabilitation facility 14 days after the procedure with complete remission of subjective symptoms.

Discussion

Urinoma is one differential diagnosis of non-neoplastic soft tissue tumors. It is a confined fluid collection caused by leakage at any level of the urinary collecting system (renal pelvis, ureter, urinary bladder, and urethra). Depending on the

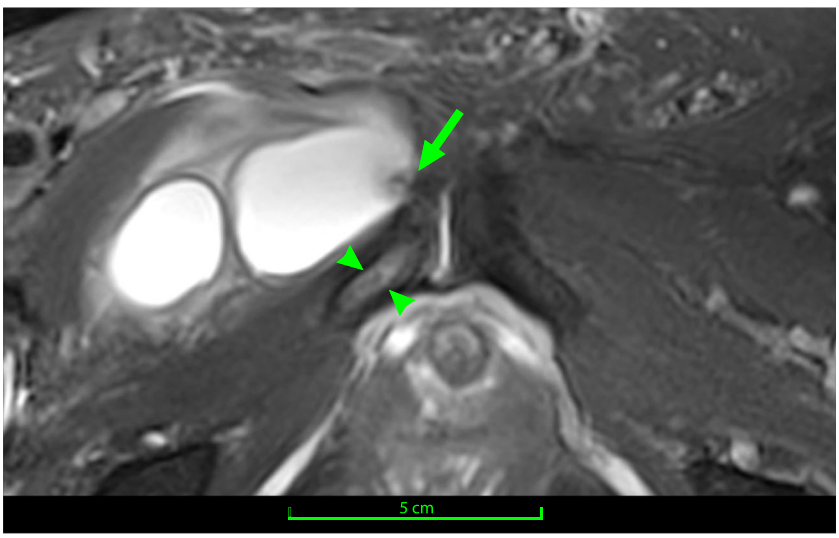

Fig. 4 T2-weighted MR-urography displays flow-void artifacts (*arrow*) between the symphysis and the adjoining marginal area of the lesion in T2-weighted images, suggesting communication. Again, the fluid-collection in the interpubic gap and parasymphyseal bone marrow edema (*arrowheads*) are evident (axial T2 TSE FS)

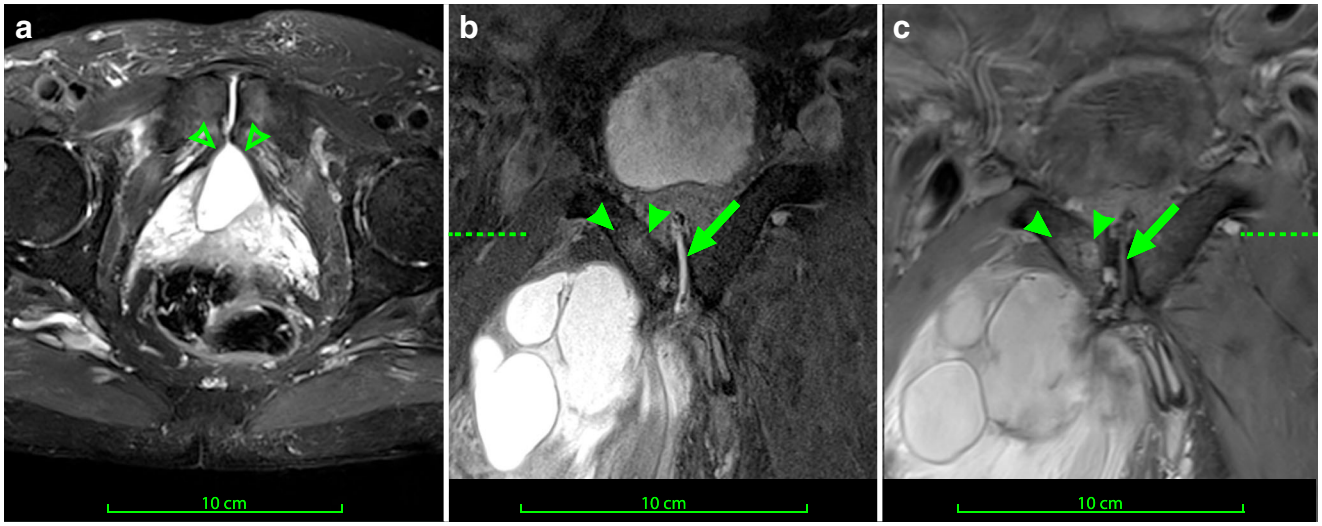

Fig. 5 Incomplete soft tissue separation of the bladder basis / the proximal urethra and the fluid-filled symphysis (*hollow arrowheads*; axial T2 TSE; **a**). Contrast-enhanced MR-urography demonstrates the prostatosymphyseal fistula (*arrows*) opening into a large urinoma (coronal T1 TSE FS delayed post-contrast; **b** and coronal PD FS; **c**). Parasymphyseal contrast enhancement indicates the preceding bone marrow edema has developed into osteomyelitis pubis (*solid arrowheads*, **b**). The *dashed lines* refer to the position of the axial images

location, it is commonly the result of blunt or penetrating trauma, iatrogenic injury during surgical or percutaneous procedures, and/or transmitted back pressure caused by downstream obstruction, e.g., urolithiasis or abnormal masses. In case of asymptomatic progression, clinical manifestation may be in the form of delayed complications such as urinary retention, electrolyte imbalances, or abscess formation. Diagnostic imaging modalities comprise roentgenograms including pyelogram/cystourethrogram, ultrasound, and contrast-enhanced CT or MRI; the latter particularly with delayed image acquisition after contrast-agent administration as a urogram equivalent. Treatment options vary based on underlying cause and individual course of the condition, encompassing conservative management, surgical reconstruction, or permanent percutaneous diversion.

Most urinomas are found in subcapsular or perinephric position as a result of blunt trauma, followed by intraperitoneal urinomas subsequent to iatrogenic or penetrating injury [5]. Extra-abdominal soft tissue urinomas are a rare variant and have been reported subcutaneously in the lumbar region secondary to orthotopic renal transplantation [6, 7] or percutaneous nephrolithotomy [5] as well as perimuscularly in the iliopsoas compartment, running caudally and extending below the inguinal ligament to the thigh, scrotum, or the perineal and gluteal regions [7]. While prostatosymphyseal fistulas and osteomyelitis pubis following TURP have been described before [8–11] and periodically included suprapubic urinomas, our case is a rarely observed and scarcely published [12–14] variant of an extended fistula which emerges into the adductor canal, forming a thigh urinoma—which in this particular instance closely resembled a soft tissue neoplasm. Prostatosymphyseal fistulas have also been observed following other urological procedures such as photoselective vaporization and radiotherapy of the prostate as well as open prostatectomy [15, 16]. If present, urinary tract infections have a significant risk of spreading along the prostatosymphyseal fistula—albeit in our case, both osteomyelitis pubis and the superinfected cavity may also have originated from open biopsy or a urinary tract infection over the course of the conservative treatment attempt, which involved suprapubic catheterization. The resolution of osteomyelitis can most likely be contributed to perioperative antibiotic treatment and/or self-limitation after chronic irritation had been eliminated by anatomical reconstruction.

The work-up of soft tissue tumors, including those with a cystic appearance, is challenging. Their imaging characteristics include hyperintensity on T2-weighted sequences in MRI imaging, (partial) fluid-equivalent density in CT imaging and/or hypoechoic portions with posterior acoustic enhancement in US imaging. On a histological level, various factors can contribute to a cystic appearance of soft tissue neoplasms [7, 17]: A high degree of vascularization is predominantly the case with vascular lesions of the proliferative (e.g., hemangioma, angiosarcoma) and the malformative kind (e.g., arteriovenous or lymphatic malformations) [18, 19]. A myxoid stroma, characterized by a high content of glycosaminoglycans that bind water and form a gelatinous extracellular matrix, is found in benign (e.g., cutaneous myxoma) and malignant myxoid masses (e.g., myxoid liposarcoma, myxoid chondrosarcoma, pleomorphic sarcoma) [20–22]. Internal hemorrhage and necrosis are common features of—although not limited to—fast-growing malignancies. Contrast-enhanced MRI is the modality of choice for prebioptic discrimination between cystic/pseudocystic lesions and

cyst-like neoplasms as well as the further narrowing down of differential diagnoses. However, uncertainties often remain and histopathological confirmation becomes necessary. In our reported case, the quick growth of the mass and a large gap (of 15 months) to any trauma or surgery initially led to the primary differential diagnosis of soft tissue sarcoma, which was then ruled out by biopsy and histopathological examination. If close proximity to the urinary structures and the patient's history direct towards the alternative differential diagnosis of urinoma (a benign pseudocystic lesion), extended delayed-phase MRI series can provide critical evidence of communication with the urinary collecting system. Picking up this diagnosis is critical. In our case, the patient would have undergone only resection of the mass without operative or interventional treatment of the fistula and it is likely that the urinoma would have re-developed.

In conclusion, benign (cystic or pseudocystic) fluid collections are a differential diagnosis to soft tissue sarcomas. Common manifestations of pseudocystic lesions include hematoma, post-operative seroma, or abscesses. We report a case of post-operative prostatosymphyseal fistula with ensuing urinoma formation in the proximal thigh as a rare variant of pseudocystic lesions in the lower extremities. MR-based urography can help to reveal such a rare entity.

Compliance with ethical standards

Conflict of interest None.

References

1. Fletcher CDM, Unni KK, Mertens F, Organization WH, Pathology IAo. Pathology and Genetics of Tumours of Soft Tissue and Bone: IARC Press, 2002.
2. Ferrari A, Sultan I, Huang TT, Rodriguez-Galindo C, Shehadeh A, Meazza C, et al. Soft tissue sarcoma across the age spectrum: a population-based study from the surveillance epidemiology and end results database. Pediatr Blood Cancer. 2011;57(6):943–9.
3. Ng VY, Scharschmidt TJ, Mayerson JL, Fisher JL. Incidence and survival in sarcoma in the United States: a focus on musculoskeletal lesions. Anticancer Res. 2013;33(6):2597–604.
4. Kransdorf MJ. Malignant soft-tissue tumors in a large referral population: distribution of diagnoses by age, sex, and location. AJR Am J Roentgenol. 1995;164(1):129–34.
5. Mathew R, Kaveriappa G, Shetty M, Suresh H. Subcutaneous urinoma: a rare sequelae to percutaneous nephrolithotomy. Muller J Med Sci Res. 2015;6(1):78–80.
6. Lee J, Darcy M. Renal cysts and urinomas. Semin Interv Radiol. 2011;28(4):380–91.
7. Titton RL, Gervais DA, Hahn PF, Harisinghani MG, Arellano RS, Mueller PR. Urine leaks and urinomas: diagnosis and imaging-guided intervention. Radiographics. 2003;23(5):1133–47.
8. Plateau B, Ruivard M, Montoriol PF. Prostatosymphyseal fistula and osteomyelitis pubis following transurethral resection of the prostate: CT and MRI findings. J Med Imaging Radiat Oncol. 2015;59(6):713–5.
9. Elshout PJ, Verleyen P, Putzeys G. Osteitis pubis after TURP: a rare complication difficult to recognize. Urol Case Rep. 2016;4:55–6.
10. Kats E, Venema PL, Kropman RF. A rare complication after endoscopic resection of the prostate: osteitis pubis due to a prostate-symphysis fistula. J Urol. 1997;157(2):624.
11. Gillitzer R, Melchior SW, Jones J, Fichtner J, Thuroff JW. Prostatosymphyseal fistula after transurethral resection of the prostate. J Urol. 2001;166(3):1001–2.
12. Wolf RF, Elzen AH, de Jong IJ. Homan van der Heide JN, Jager PL, Boeve WJ. [Giant urinoma of the thigh]. Ned Tijdschr Geneeskd. 1998;142(16):908–12.
13. Kats E, Venema PL, Kropman RF, Kieft GJ. Diagnosis and treatment of osteitis pubis caused by a prostate-symphysis fistula: a rare complication after transurethral resection of the prostate. Br J Urol. 1998;81(6):927–8.
14. Schneider T, Bach D, Rübben H. Das Urinom des Oberschenkels. Der Urologe B. 1999;39(6):505–7.
15. Bugeja S, Andrich DE, Mundy AR. Fistulation into the pubic symphysis after treatment of prostate cancer: an important and surgically correctable complication. J Urol. 2016; 195(2):391–398%@ 0022–5347.
16. Sanchez A, Rodriguez D, Cheng JS, McGovern FJ, Tabatabaei S. Prostato-symphyseal fistula after photoselective vaporization of the prostate: case series and literature review of a rare complication. Urology. 2015;85(1):172–7.
17. Ma LD, McCarthy EF, Bluemke DA, Frassica FJ. Differentiation of benign from malignant musculoskeletal lesions using MR imaging: pitfalls in MR evaluation of lesions with a cystic appearance. AJR Am J Roentgenol. 1998;170(5):1251–8.
18. Cox JA, Bartlett E, Lee EI. Vascular malformations: a review. Semin Plast Surg. 2014;28(2):58–63.
19. Sepulveda A, Buchanan EP. Vascular tumors. Semin Plast Surg. 2014;28(2):49–57.
20. Willems SM, Schrage YM, Baelde JJ, Briaire-de Bruijn I, Mohseny A, Sciot R, et al. Myxoid tumours of soft tissue: the so-called myxoid extracellular matrix is heterogeneous in composition. Histopathology. 2008;52(4):465–74.
21. Kindblom LG, Angervall L. Histochemical characterization of mucosubstances in bone and soft tissue-tumors. Cancer. 1975;36(3):985–94.
22. Willems SM, Wiweger M, van Roggen JF, Hogendoorn PC. Running GAGs: myxoid matrix in tumor pathology revisited: what's in it for the pathologist? Virchows Archiv: Int J Pathol. 2010;456(2):181–92.