3.3 Testicular Tumours in prepubertal boys

*3.3.1 **Epidemiology and pathophysiology***

Testicular tumours constitute about 1-2% of all paediatric solid tumours [149]. They originate from various cell types within the testis, with the specific cell of origin determining the tumour's phenotype. This document addresses prepubertal testicular tumours. For information regarding postpubertal testicular tumours, we refer to the EAU Testicular Cancer Guidelines [138].

In prepubertal boys, testicular tumours differ significantly from those in adolescent and adult men: they have a lower incidence (0.5 to 2 per 100,000 children, with a peak incidence between ages 0 and 4), they have a different histologic distribution, they are mostly benign (60-75%) [149-154], and intratubular neoplasia (TIN) is practically non-existent in children [155-160]. Testicular tumours can generally be classified as germ cell tumours (GCT) or stromal tumours. Among prepubertal intra-testicular tumours, GCT account for 71-90%, of which approximately 40% to 50% are teratomas, with reports of immature teratomas in this age group [156, 161]. Epidermoid cysts comprise up to 10% to 15% of all GCTs and are consistently benign [157]. Malignant GCTs, predominantly yolk-sac tumours, range from 8% to 30% in frequency.

One specific tumour type is gonadoblastoma, which contains germ cell and stromal cell tumour types and will occur almost exclusively in the setting of DSD [162].

For differential diagnosis of a scrotal mass, paratesticular tumours should be excluded, such as benign types (leiomyoma, fibroma, lipoma, hemangioma, cystic lymphangioma, and lipoblastoma), in addition to the malignant tumours such as a rhabdomyosarcoma [162-164].

*3.3.2 **Clinical presentation***

Clinical presentation is a painless scrotal mass in more than 90% of the patients, detected by the caregiver, physician or the patient himself. A history of a trauma, pain or hernia is rare. A hydrocele can be found in 15 – 50% of patients [151, 163]. In boys with early onset of puberty (e.g. early penile and prepubic hair growth) as well as high testosterone and low gonadotropin levels, a Leydig cell tumour should be excluded [164].

*3.3.3 **Evaluation***

Ultrasound

To confirm the diagnosis, a high-resolution US examination (7.5 – 12.5 MHz), preferably a doppler US, is required. The detection rate is almost 100% [165-168]. However, it can be challenging to differentiate between benign and malign tumours by US alone. In adults, smaller tumour size, heterogenous masses, hyperechogenicity, peripheral Doppler flow and non-enhancement on US have a significant lower OR of malignancy, however evidence for prepubertal males is scarce [169].

Microlithiasis

With high-resolution US, microlithiasis (hyperechoic, non-shadowing foci 1-3 mm in diameter within the testicular parenchyma) is increasingly seen in prepubertal boys. The incidence of microlithiasis is significantly higher in patients who had undergone orchiopexy [170]. Routine monthly self-examination of the testes is recommended in children with microlithiasis with contributing risk factors from puberty onwards [12]. When microlithiasis is still present during transition to adulthood a more intensive follow-up could be considered. Due to the low incidence of a contralateral tumour, even in cases of testicular microlithiasis, there is no indication for contralateral testicular biopsy in prepubertal boys [169].

Tumour markers

When tumour markers are used, age of the patient should be taken into account, since alpha-fetoprotein (AFP) has a clear limitation of its sensitivity and specificity in the first months of life [163], and sometimes takes up to twelve months before the serum concentration reaches the known standard values (< 10 ng/mL) [154, 171]. It is produced by > 90% of yolk sac tumours. Teratomas can also produce AFP, but not to that extent of yolk sac tumours [172]. Alpha-fetoprotein should be measured before any therapeutic intervention (tumour enucleation/orchiectomy) and should be measured five days after tumour resection/orchiectomy in those with an elevated AFP according to the half-life time of AFP. Human chorionic gonadotropin (ß-hCG) is derived from chorion carcinoma, embryonal carcinoma or seminoma. However, these tumours are extremely rare in prepubertal boys and therefore, ß-hCG is not a useful tumour marker in prepubertal boys.