

## Extraprostatic extension (pT3a) in prostate biopsy is an under-recognized feature indicating high risk disease

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### 1. Introduction

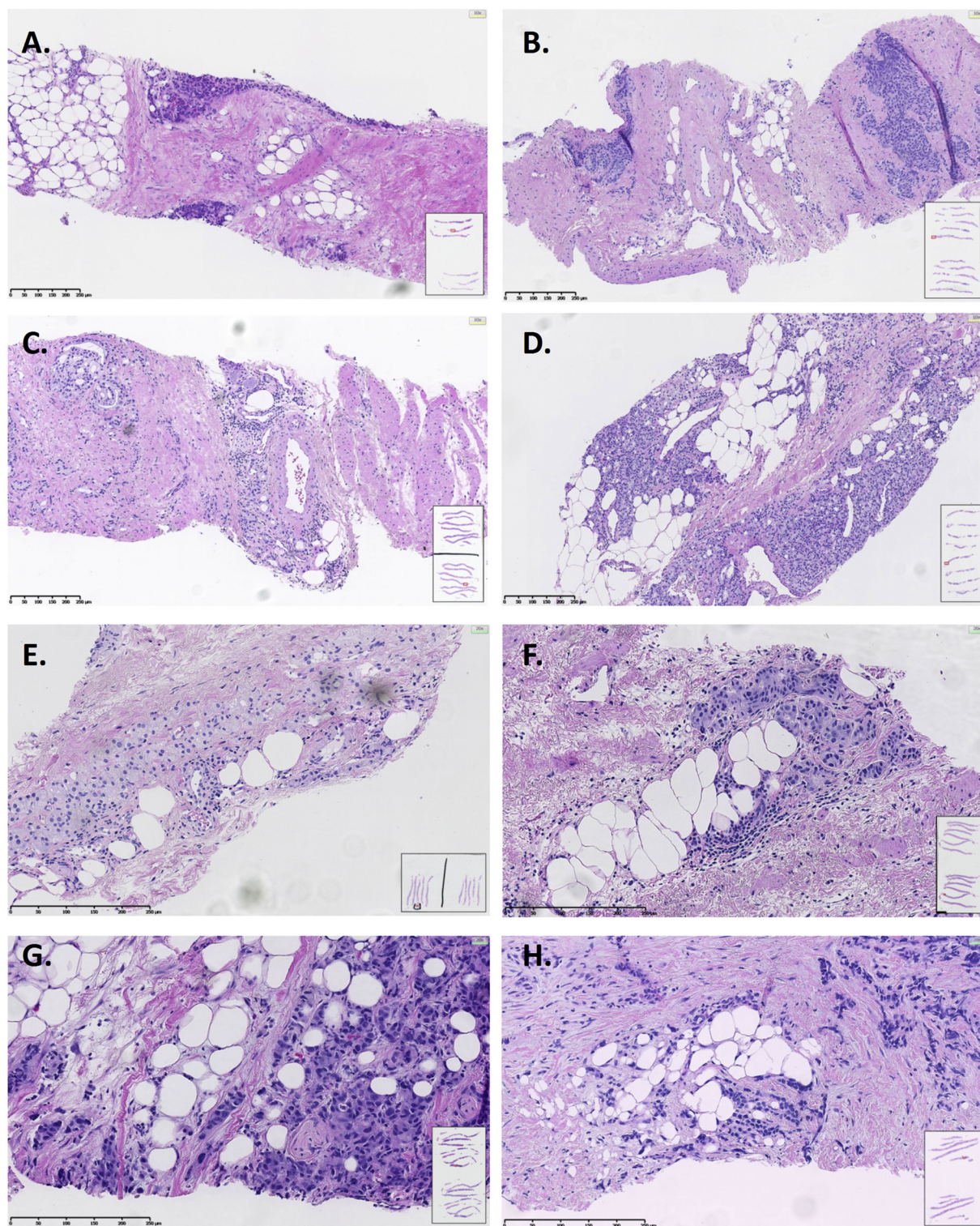
Extraprostatic extension (EPE+) is a strong prognostic factor of prostate cancer [1], which is commonly detected in the histological examination of radical prostatectomy specimens. The three recognized histological criteria for EPE+ include: deformation of the contour of the prostate by cancer, growth along the posterolateral neurovascular bundles, and infiltration to the periprostatic fat. In the case of prostate biopsies, only the last criterion is applicable.

In previous few reports the incidence of EPE+ in prostate biopsies has been low [2–4]. The pitfalls causing diagnostic uncertainty relate to striated muscle and intraprostatic fat [5]. Cancer infiltrating to the striated muscle may be suggestive for EPE+ in biopsies, but because striated muscle is also found inside the apical prostate (near urethra), it is considered as an unreliable criterion for extraprostatic growth [6]. This is supported by the finding that cancer growing to the striated muscle at apical region in the radical prostatectomy specimen is not associated to adverse prognosis [7]. Some studies have suggested that small amounts of fat may exist in prostate (0–4% cases) [8–10]. Therefore, a reliable histological diagnosis of EPE+ in needle biopsies requires that the cancer infiltrates to the extraprostatic fat through the pseudocapsule at the tip of biopsy core [9]. In the present study, we used criteria suggested by Sung et al. [9] histological examples of prostate biopsies containing EPE+ are presented in Fig. 1.

Due to variable clinical course and different treatment options for prostate cancer, a large number of predictive and prognostic histopathological parameters have been established [11]. These include WHO/ISUP Grade Group, Gleason score (GS), the worst GS consisting of the predominant and the most aggressive pattern in a single biopsy, percentage of Gleason pattern 4/5, the length of the biopsy and the length of cancer, percentage of cancer, number or percentage of positive cores, and perineural invasion [12–19]. Besides grade and volume parameters, EPE+ in needle biopsies is recognized in e.g. in the guideline by the European Association of Urology with a recommendation to include it to the pathology report [11]. However, no specific treatment recommendations are included for patients with EPE+ in needle biopsies.

In summary, the histological criteria for diagnosing EPE+ in the needle biopsies are well established, but the data on the incidence and predictive value of EPE+ in needle biopsies is limited. This study was conducted to find out the incidence and clinicopathological features of EPE+ in prostate biopsies in an unselected, consecutive patient material.

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**Fig. 1.** Histological examples of extraprostatic growth by cancer showing infiltration to the fat in prostate biopsy tip regions. Images were acquired with Hamamatsu Nanozoomer XR slide scanner at  $0.23 \mu\text{m}/\text{pixel}$ , captured fields corresponding to  $10\times$  (A–D) and  $20\times$  (E–H) magnification of NDPView software. A  $250 \mu\text{m}$  scale bar is presented at the lower left corner of each image.

## 2. Materials and methods

### 2.1. Case selection

The study was approved by the Ethical Committee of Tampere University Hospital (TAUH) and the National Authority for Medicolegal Affairs. We reviewed 1242 consecutive pathology reports of prostate

biopsies submitted to Fimlab Laboratories Inc. between 1st March 2013 and 10th September 2014. The biopsies were taken by 26 urologists and one radiologist practicing in TAUH district where Fimlab Laboratories Inc. is the central laboratory receiving all histology specimens in the public healthcare. All except one biopsy set were taken transrectally under ultrasonography guidance using an 18-gauge needle biopsy gun with an 18-mm sample notch (Bard peripheral vascular, Temple, AZ,

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