

A quick and a cost-effective stain for cytology; 12 years of experience in using Leishman stain

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Leishman stain is the most commonly used Romanowsky stain in haematology, for the interpretation of blood pictures and bone marrow aspirations. The same stain can be utilized effectively in routine cytology reporting as well (1-3). Leishman stain has been in practice for the past 12 years and this stain is also excellent in the interpretation of cytology, as the other most commonly used two stains, Haematoxylin and Eosin (H & E) and Papanicolaou stain.

Staining with Leishman is a simple, and an easy to practice procedure. It can be utilized in any laboratory, even with limited facilities. No special trained technical officers in histopathology are required for staining of these smears. Thus, the stain can be utilized easily even in any peripheral laboratory as well (4).

Another value of this stain is its ability in improving the turnaround time of results, as it takes only 15 minutes to complete the staining. No special fixative is necessary as the slides are only air dried just after making the smear. Staining with H & E takes 45 minutes and Papanicolaou staining takes about 60 minutes. When compared with H & E and Papanicolaou, Leishman stain is the cheapest, and the most cost-effective stain in cytology. Cost per preparation of one slide using Leishman stain is only 85.00 LKR. Cost per slide in H & E is around 400.00 LKR and cost per slide in Papanicolaou method is approximately 625.00 LKR.

Several studies conducted to compare the value of Leishman stain against H&E and Papanicolaou stain has also revealed the value of using Leishman stain for cytology (3-5).

These studies have identified Leishman stain as a simplified, economical and comparable stain.

Leishman stain can be used for staining Fine Needle Aspiration Cytology (FNAC) smears for both palpable lesions as well as US guided or CT guided FNAC of deep-seated lesions. It can be used to stain effusion cytology as well as exfoliative cytology.

Leishman stain allows better appreciation of cell size, nuclear size, cytoplasmic details and gives excellent staining of background elements and inter-cellular matrix components (2). One good example is the commonly encountered solitary thyroid nodule with colloid. Colloid is well stained and easily identifiable with Leishman stain (Figures 1 & 2). Colloid stains as a pale pink material in H & E and can be easily confused with plasma.

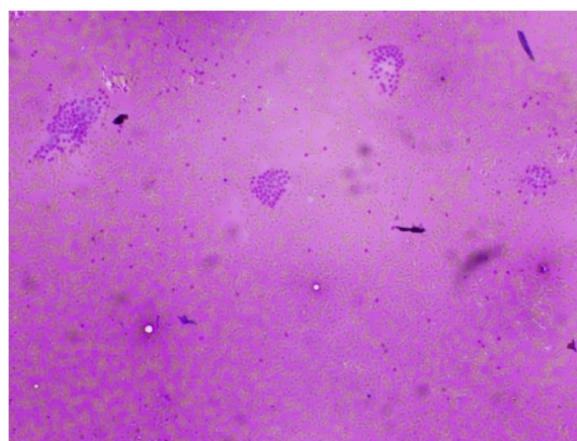


Figure 1: Thin colloid in a colloid nodule.
(Leishman stain, x 40)

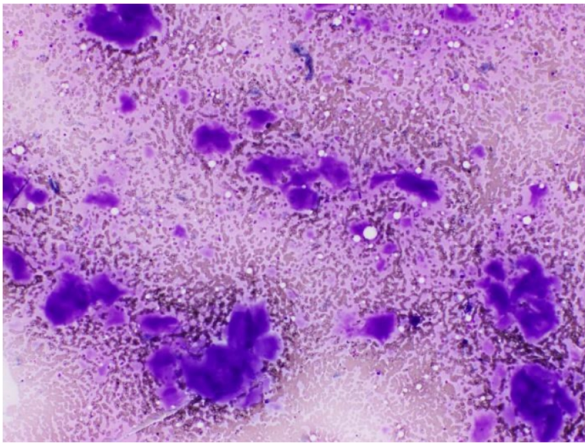


Figure 2: Thick colloid in a colloid nodule.
(Leishman stain, x 40)

As the smears are air dried, the cells become larger in size. Benign and malignant lesions can be easily differentiated as the cytological features of malignancy like nuclear pleomorphism irregular nuclear membranes, prominent nucleoli and coarse chromatin clumping are easily seen.

Mitoses are easily identifiable as well as the necrotic tumour debris in the background (Figure 3, 4, 5 & 6).

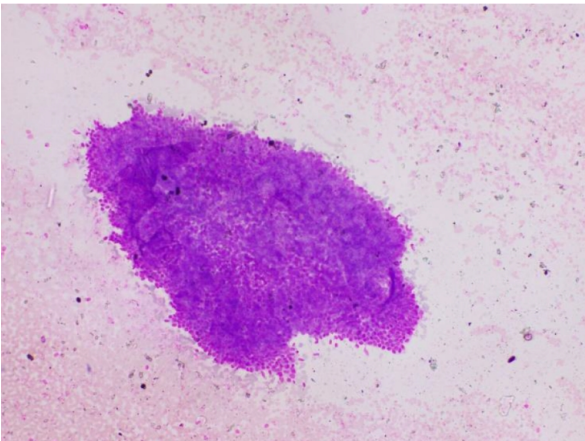


Figure 3: Benign breast epithelial cell cluster
(Leishman stain, x 40)

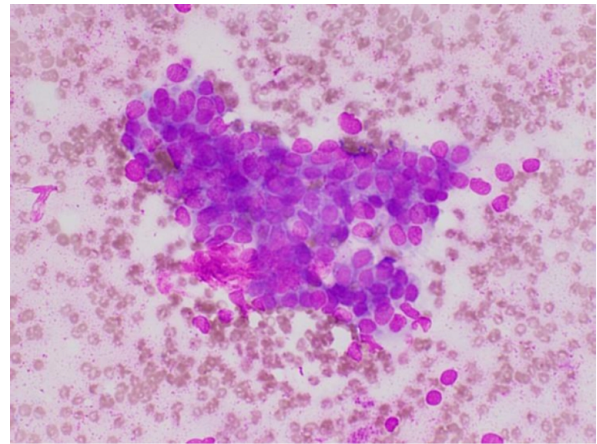


Figure 4: Benign breast epithelial cell cluster
(Leishman stain, x 400)

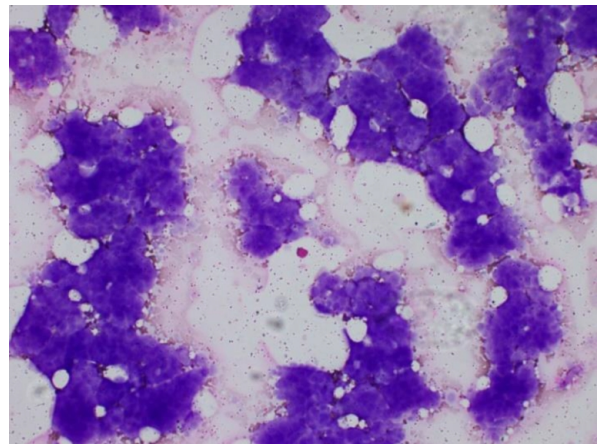


Figure 5: Malignant breast epithelial cell clusters
(Leishman stain, x 40)

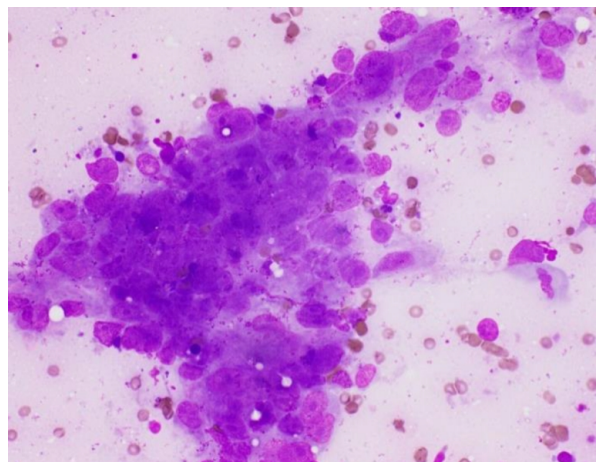


Figure 6: Malignant breast epithelial cells
(Leishman stain, x 400)

Leishman stain has the ability to provide better cytoplasmic differentiation of cells. The polymorphic nature of reactive lymphoid populations is better identified in Leishman stain than H&E or Papanicolaou stain as Leishman stains the cytoplasm well, in immature lymphoid cells. One of the best and common example is autoimmune thyroiditis with a spectrum of lymphoid infiltrate with lymphocytes, plasma cells, centrocytes and centroblasts and thyroid epithelial cell clusters infiltrated by lymphoid cells (Figure 7 & 8).

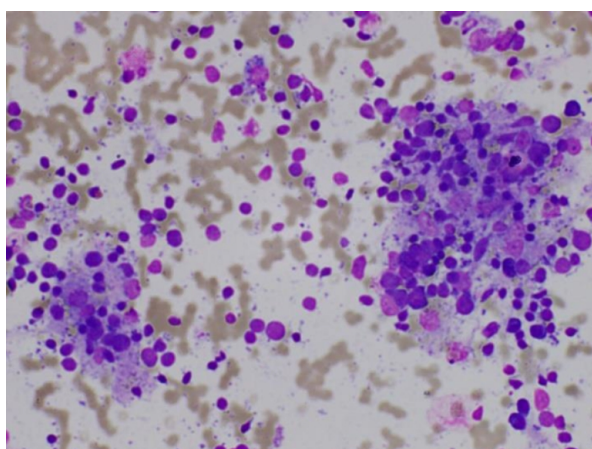


Figure 7: Autoimmune thyroiditis
(Leishman stain, x 400)

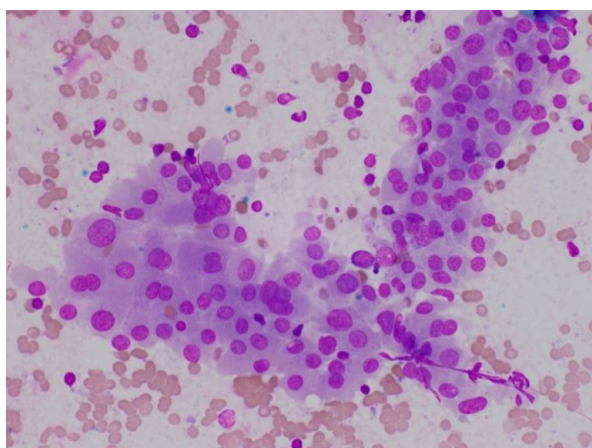


Figure 8: Autoimmune thyroiditis
(Leishman stain, x 400)

Papillary carcinoma of thyroid is a malignant thyroid neoplasm often encountered in cytology, which is diagnosed mainly on nuclear features and all these nuclear details like irregular nuclear membranes, nuclear grooves and intra-nuclear pseudo inclusions (arrow) are well demonstrated in Leishman stain (Figures 9 & 10).

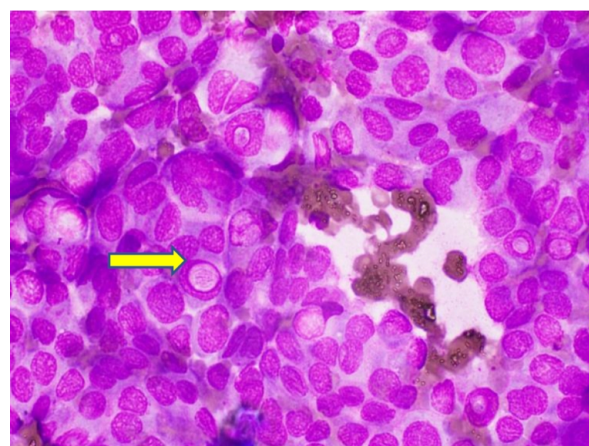


Figure 9: Papillary carcinoma
(Leishman stain, x 400)

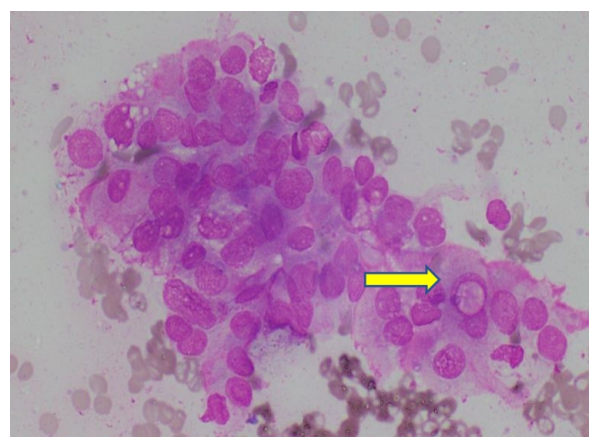


Figure10: Papillary carcinoma
(Leishman stain, x 400)

Romanowsky stains are excellent in staining the ground substances by metachromasia (4). This feature is of value when interpreting lesions with lots of ground substance like the commonly encountered benign breast lump, fibroadenoma with myxoid stroma (Figure 11). Benign salivary neoplasm; pleomorphic adenoma is another tumour which can be easily identified due to the intense metachromasia of the ground substance (Figure 12).

This differentiation of ground substance is not well demonstrated in H & E and Papanicolaou stains.

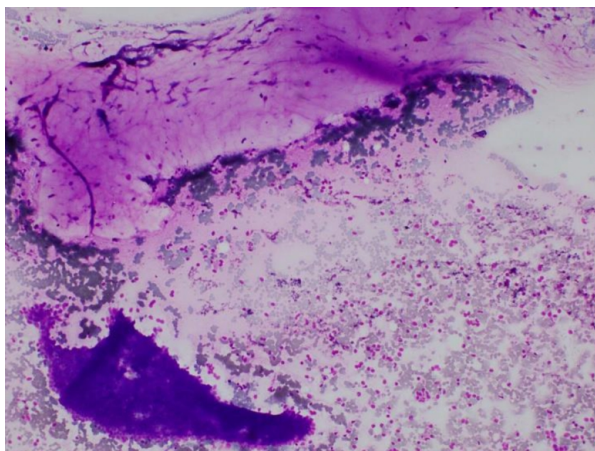


Figure 11: Fibroadenoma breast
(Leishman stain, x 40)



Figure 12: Pleomorphic adenoma, parotid
(Leishman stain, x 40)

Therefore, Leishman stain is an excellent stain in cytology, which can give a quick and reliable diagnosis to the patient. It is a cheap and cost-effective stain which should be utilized more often in a developing country like Sri Lanka because of its cost effectiveness and it can bring down the health budget of the country.

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