International Journal of Current Science Research
www.drbgrpublications.in

Volume: 5; Issue: 1; January-2019; pp 1718-1722. ISSN: 2454-5422

Cell Block Cytology: Utility and efficacy in diagnostic cytology

Dr Pradkhshana Vijay*[1], Senior Resident, Dept. of Oral Pathology and Microbiology, KGMU, Lucknow,

Dr Nilesh Pardhe[2] Prof. and Head, Dept. of Oral Pathology and Microbiology, NIMS Dental College, Jaipur,

Dr Shaleen Chandra[3] Prof. and Head, Dept. of Oral Pathology and Microbiology, KGMU, Lucknow,

Dr Supriya Sharma[4] Senior Resident, Dept. of Oral Pathology and Microbiology, KGMU, Lucknow,

Dr Priyanka Singh[5] Assistant Professor, Dept. of Oral Pathology and Microbiology, KGMU, Lucknow

*Corresponding author Mail id: vijaydhar38@yahoo.in

Abstract

Main constraint of the conventional Fine needle aspiration cytology is the inadequate material availability for specialized diagnostic investigations including Immunocytochemistry. The cell block technique possibly will abet in overcoming this limitation. Cell blocks are prepared from fine-needle aspirations and tissue fluids. It is a helpful adjunct to smears so as to establish a definitive diagnosis based on cytopathology. Cell blocks help in tumor grouping which cannot be achieved by cytological smears alone. Cell-block preparations made from sedimented cells is a useful adjunct to routine cytological methods used. Preparation is superior and presents brilliant cytomorphologic features, ensuring best conservation of immunocytochemical and histochemical properties. Advantages of technique are simpler protocol to follow and use of routine laboratory chemicals. A note of effectiveness of cell block technique is also stated.

Keywords: Fine needle aspiration cytology, cell block, paraffin, fixative, centrifuge, Immunocytochemistry

Introduction

Fine needle aspiration cytology (FNAC) of superficial lesion or deep anatomical site is an increasingly common procedure in diagnosis of neoplastic lesions [Bales CE and Durfee GR 1992]. Sometimes FNAC does not yield sufficient information for precise diagnosis and the risk of false negative diagnoses always exists. In order to overcome these problems, cell block technique has been resorted to make the best use of the available material [Keyhani-Rofaga S, O'Toole RV, Leming MF, 1984]. The methods mainly include direct transfer of all centrifuged cellular material wrapped in crayon paper, embedding in paraffin and then processing as a routine histological specimen. Cell block preparation in a way mimics the histopathological sections.

Step by step procedure of Cell Blocking technique: [Zito FA, Gadaleta CD, Salvatore CL *et al* 1995]

1. Following smear preparation, needles and syringes used in aspiration are rinsed in 10 ml of 50% ethanol in a specimen container
2. Residual clot or tissue in the hub of needles was removed carefully in the laboratory with the aid of another needle and rinsed in 50% ethanol
3. Entire material was centrifuged in a 10-ml disposable centrifuge tube at 4,000 rpm for 6 minutes to create 1 or more cell pellets
4. The supernatant fluid was transferred and deposit fixed in *improvised ethanol formalin fixative* consisting of 9 parts of 100% ethanol and 40% formaldehyde.
5. Centrifuged deposits of clots, washings, and other fluids following smear preparations, were similarly fixed for cell blocking.
6. Deposits more than 0.2 ml thick were detached carefully from the bottom of the centrifuge tube with the aid of a sharp-edged dipstick.
7. Thick centrifuged deposits were placed in several tubes for multiple cell blocks before fixing in fixative solution.
8. At the end of 45 minutes fixed cell pellets were recentrifuged at 4,000 rpm for 6 minutes.
9. Pellets should be removed easily with a disposable Pasteur pipette following centrifugation.

10. The cell pellets were wrapped in crayon paper, placed in a cassette, and stored in 80% ethanol until ready for processing using 13- hour processing schedule as follows: 80% ethanol with 1 change (2.5 hours); 95% ethanol (1 hour), 100% ethanol, 4 times (1 hour each), 1:1 ethanol/xylene (1 hour); xylene, 3 times (1 hour each), paraffin wax, 60°C (1 hour); and paraffin wax, 60°C.
11. The cell blocks were embedded in paraffin and sectioned at 3 µm thickness
12. Following this Staining of tissue can be done using routine Hematoxylin and Eosin stain or special stains for micro-organisms or pigments. Specialized staining using Immunohistochemistry can also be done.

Advantages of cell block

Multiple sections of the same material can be taken for special stains and immunohistochemistry.

Also, morphological details can also be obtained with cell block method, which include preservation of the architectural pattern, excellent nuclear and cytoplasmic details, and individual cell characteristics [Karnanuchow PN, Bouin RE 1992].

Fragments of tissue can easily be interpreted in a biopsy-like fashion

Discussion

Interpretation of exfoliated human body cells is done using Diagnostic cytology. Even a well prepared cytological smear from fine needle aspirate and fluids leaves small amount of residual material that may contain valuable information and hence remains uninvestigated. This remaining residual material can be examined in a simple and convenient way by using cell block technique. The cell block technique uses centrifuged residual material which is embedded in paraffin and examined like a normal biopsy tissue. Immunocytochemistry is mainly used in diagnosis of fine needle aspirates [Krogerus LA, Andersson LC. 1988].

A wide range of histologic fixatives have been used for cell blocks, chiefly buffered formalin, neutral buffered formalin solution, picric acid fixative, Bouin solution, ethanol and Carnoy fixative. Lillie modified B-5 fixative is a protein precipitant fixative mainly recommended for lymphoid and hematopoietic cells of lymph nodes and bone marrow biopsy specimens, respectively. This is because of the excellent morphologic presentation and staining properties

induced by this fixative. Also, it takes advantage of short 13 hour processing schedule for small biopsies. It also has been the fixative of choice in immunohistochemistry [Leung SW, Bedard YC 1993]. Cell blocks are a necessity arising from difference in technique and practice of the attending physicians aspirating the lesions that may result in diagnostic material left clotted or trapped in the needle and poor quality smears [Domagala WM, Markiewski M, Tuziak T, *et al* 1990].

FNAC specimens having insufficient cells in the smears can also be supported by the cell blocks which contain proteinaceous material, which further demonstrates the technical merit of this preparation to trap microscopic tissue particles, if present, by precipitation of the tissue fluids [Olson NJ, Gogel HK, Williams WL, *et al*. 1986]. Cell block provides high cellularity, better morphological and architectural pattern and hint of malignant cells increasing the sensitivity of cytodiagnosis compared to smear method [Bales CE, Durfee GR 1992].

Conclusion

A new simple and reliable cell block technique that is suitable for all types of cytology specimens is presented. The contribution of cell blocks to the final cytologic diagnosis supports the view that cell blocks should be considered in all fine-needle aspiration specimens whenever possible after review of the smears.

References

Bales CE, Durfee GR. Cytological technique, part 1. In: Koss LG, ed. *Diagnostic Cytology and Its Histopathologic Bases. 4*th ed. Philadelphia, PA: Lippincott; 1992: 1451-1474.

Domagala WM, Markiewski M, Tuziak T, et al. Immunocytochemistry on fine needle aspirates in paraffin miniblocks. Acta Cytol. 1990;34: 291-296.

Karnanuchow PN, Bouin RE. Cells block technique for fine needle aspiration biopsy. J Clin Pathol 1992;35: 688.

Keyhani-Rofaga S, O'Toole RV, Leming MF. Role of the cell block in fine-needle aspirations. *Acta Cytol. 1984;28: 630*-631.

Krogerus LA, Andersson LC. A simple method for the preparation of paraffin-embedded cell blocks from fine needle aspirates, effusions and brushings. Acta Cytol. 1988;32: 586-587.

Leung SW, Bedard YC. Methods in pathology: simple miniblock technique for cytology. Mod Pathol. 1993;6: 630-632.

Olson NJ, Gogel HK, Williams WL, et al. Processing of aspiration cytology samples: an alternative method. Acta Cytol. 1986;30: 409-412.

Zito FA, Gadaleta CD, Salvatore CL et al. A modified cell blocks technique for fine needle aspiration cytology. Acta Cytol 1995;39: 93–9.