THE INTERNATIONAL JOURNAL OF SCIENCE & TECHNOLEDGE

Comparative Study of Gynaecological and Non-Gynaecological Samples Received in Igbinedi on University Teaching Hospital

Ikhide G. Ilegbedion

Lecturer, Department of Medical Laboratory Science,
Niger Delta University, Wilberforce Island, Nigeria

Beredugo, Sylvanus

Assistant Lecturer, Department of Medical Laboratory Science,
Niger Delta University, Nigeria

Eric, Emmanuel Uchenna

Lecturer, Department of Medical Laboratory Science,
Niger Delta University, Nigeria

Abstract:

Background: Gynaecological and non-gynaecological samples are two main types of cytological sample. The Gynaecological samples are usually Pap (cervical) smears, Vagina smear, Endocervical aspiration, Endometrial aspiration etc. Non-gynaecological samples fall into two categories, exfoliative and fine needle aspiration samples. The sample size of this study was 32 and was determined using the method of Naing, Winn, and Rusli, (2006). Aim: This study was aimed at comparing the efficacy of the gynaecological sample and non-gynaecological sample in a variety of parameters including cellular morphology, specimen preparation, screening time, and impact on the final result. Materials and methods: Gynaecological sample was obtained by introducing a spatula into the vagina with the aid of speculum. The cellular material obtained was rapidly but gently smeared on a clean glass slide and the smear made was fixed while it is wet for Papanicolaou staining and was cleared, mounted and studied microscopically. Non-Gynaecological sample – sputum was collected with a deep cough from the lungs early in the morning before eating and deposited directly into a preservative container. Air-dried smears were fixed in methanol for 15 minutes and rinsed in buffer. The smear was stained with May-Grunwald for 5 minutes and stained again with Giemsa for 10 minutes. The smear was differentiated in buffer and allowed to air dried, cleared in xylene and mounted with DPX. Results: This present study revealed that cervical cases occurred more in younger age (30-39) when compared to non gynaecological cases (sputum) which occurred more in older adults (age group 50-59). Conclusion: Treating all cervical pre-cancers can prevent almost all cervical cancers. Cervical smear showed predominately parabasal and intermediate cell, eosinophilic cells with increased nuclear/ cytoplasmic ratio and eccentric cells. However, the sputum cytology show basically cells with increased nuclear/ cytoplasmic ratio.

Keywords: Gynaecological, FNAC

1. Introduction

Gynaecological and non-gynaecological samples are two main types of cytological sample. The Gynaecological samples are usually Pap (cervical) smears, vagina smear, Endocervical aspiration, Endometrial aspiration etc. Non-gynaecological samples fall into two categories, exfoliative and fine needle aspiration samples. Exfoliative specimens are non-gynaecological specimens from areas of the body where cells are shed (or scraped/brushed) from the lining of organs or tissues into various fluids. Sites of exfoliative specimens include: Lungs-sputum, bronchial washings/brushings etc. Lower urinary tract – urine (voided/catheterized). Chest and abdominal cavities – pleural, pericardial and peritoneal fluid. Central nervous system – CSF. Gastrointestinal tract – oesophageal, stomach/intestinal brushings. FNAC samples are taken from a wide variety of organs and tissues. In the past, FNAC was limited to clinically palpable lesions, but radiologic technology such as CT and ultrasound now allow for access to deep seated impalpable lesions. Common sites sampled by FNAC include breast, thyroid, salivary glands and lymph nodes. A wide range of non-neoplastic and neoplastic diseases can be diagnosed by this technique. FNAC is a simple, fast, effective and relatively cheap procedure and a valuable primary diagnostic tool, which can be followed by tissue biopsy in cases where the cytology does not permit a definitive diagnosis (Orellet *et al.*, 1986).

2. Materials and Methods

2.1. Study Area

The study was carried out at Igbinedion University Teaching Hospital (IUTH), which is located in Okada town, Ovia north east local government area Benin city, Edo state. Edo state is in the southern part of Nigeria. Okada town is 50km north-west of Benin city located at latitude of 6°44'N and longitude of 5° 23'E with an area of 2,301 Km² and a

population of 153,849 at the 2006 census. The Okada land is rich in agricultural product, prime apples, timber trees and palm trees.

2.2. Method of Gynaecological Sample Collection (Cervical Smear)

The sample will be obtained by introducing a spatula into the vagina with the aid of speculum. The spatula will be introduced into the endocervical canal and gentle pressure will be applied until the shorter side bend from contact with the ectocervix. While maintaining gentle pressure, the spatula will be rotated through 360 clockwise directions. The cellular material will be obtained rapidly but gently smear on a clean glass slide and the smear made will be fixed while it is wet for Papanicolaou staining and will be cleared, mounted and studied microscopically.

2.3. Papanicolaou Staining Technique

The smear will be hydrated in descending grade of alcohol and stained in Harris Haematoxylin for 5 minutes, it will be rinsed in tap water. The smear will be differentiated in 1% acid alcohol for 15 second. It will be Blued in Scott's tap water for 5 minutes. It will be dehydrated in 70% alcohol, then in 2 changes of 95% alcohol for 2 minutes each. It will be stained in OG-6 for 2 minutes followed by rinsing in 2 changes of 95% alcohol for 2 minutes each. It will be stained in EA-50 for 3 minutes. The smear will be rinsed in 3 changes of alcohol for 10 seconds each. Finally, it will be transferred to 2 changes of absolute alcohol for 10 second each. It will be cleared in 3 changes of Xylene for 3 minutes each and will be mounted with DPX.

2.4. Collection of Non-Gynaecological Sample (Sputum)

The sputum sample will be collected with a deep cough from the lungs early in the morning before eating and will be deposited directly into container containing preservative. A bloody, discolour and solid particles will be examined and Small portion of this particles will be smeared evenly and fixed immediately and will be stained with May-Grunwald Giemsa.

2.5. May- Grunwald Giemsa Technique

Air-dried smears (DM) will be fixed in methanol for 15 minutes and rinsed in buffer PH 6.8. The smear will be stained with May-Grunwald for 5 minutes and stained again with Giemsa for 10 minutes. The smear will be differentiated in buffer and will be allowed to air dry. The smear will be Cleared in xylene and mounted with DPX.

3. Results

Figure 1: (Photomicrograph of Cervical Smear): Slide A-D Are Predominately Parabasal (PB) and Intermediate Cell (IT). Eosinophilic Cells with Increased Nuclear/Cytoplasmic Ratio (Dash Arrow) and Eccentric Cells (Arrow) MGG X400 and X100

Figure 2: (Photomicrograph of Sputum): Slide A-D Show Basically Cells with Increased Nuclear/ Cytoplasmic Ratio (Arrow) X100

4. Discussion

Women between the ages of 20 and 39 years have higher prevalence of cervical dysplasia than younger women and literatures agreed on the increasing occurrence of abnormal smear in this age group probably related to sexual exposure and the likelihood of infection with HPV (Kobelin *et al.*). This present study revealed that cervical cases occurred more in younger age (30-39) when compared to non gynaecological cases (sputum) which occurred more in older adults (age group 50-59). Our results agrees with the result of Makuza *et al.*, 2015 where age group 30-39 was the highest reported in cervical cancer with 47.7%. However, it differs in the least occurred age groups where they reported age group 46-50 (11.4%) as against the present study of where we recorded age group 40-49%.

This high prevalence of age group 30-39 could be due to the lifestyle, constant exposed to the virus, by means of early sexual debut, early marriage, multiple sexual partners due to polygamy, and high divorce rates. Acquisition of HPV infection has been shown to be strongly related to sexual behaviour, and the prevalence of HPV increases with increasing number of sexual partners and early sexual debut (Aminu *et al.*, 2014).

Most cervical cancers begin in the cells in the transformation zone. These cells do not suddenly change into cancer. Instead, the normal cells of the cervix first gradually develop pre-cancerous changes that turn into cancer. Doctors use several terms to describe these pre-cancerous changes, including cervical intraepithelial neoplasia (CIN), squamous intraepithelial lesion (SIL), and dysplasia. These changes can be detected by the Pap test and treated to prevent cancer from developing. Although cervical cancers start from cells with pre-cancerous changes (pre-cancers), only some of the women with pre-cancers of the cervix will develop cancer. It usually takes several years for cervical pre-cancer to change to cervical cancer, but it also can happen in less than a year. For most women, pre-cancerous cells will go away without any treatment. Still, in some women pre-cancers turn into true (invasive) cancers. Treating all cervical pre-cancers can prevent almost all cervical cancers. In our study the cervical smear showed predominately parabasal and intermediate cell, eosinophilic cells with increased nuclear/cytoplasmic ratio and eccentric cells. However, the sputum cytology show basically cells with increased nuclear/ cytoplasmic ratio.

5. References

- i. Aminu, M., Gwafan, J., Inabo, H., Oguntayo, A., Ella, E., and Koledade, A. (2014). Seroprevalence of human papillomavirus immunoglobulin G antibodies among women presenting at the reproductive health clinic of a university teaching hospital in Nigeria. *International Journal of Women's Health*, 6, 479–487.
- ii. Argon, A., Uyaroglu, M.A., Nart, D., Veral, A., and Kitapcioglu, G. (2013). The effectiveness of the liquid-based preparation method in cerebrospinal fluid cytology. *Acta Cytol*: 57: 266–270.
- iii. Barbesino, R.Y., Nando, K., Mccrory, D. C., Myers, E. R., Bastian, L. A., Hasselbald, V., Hickey, J. D., and Matchar, D. B. (2000). Accuracy of the papanicolaou test in screening for and follow-up of cervical cytology abnormalities: a systemic review. *Annals of internal Medicine*: 132:810-819.
- iv. Bedard, Y.C., and Pollet, A.F. (1999). Breast fine-needle aspiration. A comparison of ThinPrep and conventional smears, *American Journal of Clinical Pathology*, 111(4):523–527.
- v. Bernstein, S.J., Sanchez-Ramos, L., and Ndubisi, B. (2001). Liquid-based cervical cytologic smear study and conventional Papanicolaou smears: a metanalysis of prospective studies comparing cytologic diagnosis and sample adequacy. *American Journal of Obstetrics and Gynecology* 185:308-317.
- vi. Bouchardy, C., Vassilakos, P., and Riotton, G. (1987). Endometrial cytohistology by the pistol-aspiration technique: Clinical applicability. *Obstetrics and Gynecology*; 70:389–93.
- vii. British Thoracic Society bronchoscopy guidelines committee. British Thoracic Society Guidelines for Diagnostic Flexible Bronchoscopy. *Thorax* 2001, 56 i1–21.
- viii. Canavan, T.P., and Doshi, N.R. (2000). Cervical cancer. *American Family of physician*; 61(5) 1369-76.
- ix. Cervical Cancer Treatment (PDQ). NCL (2014). Archived from the original.
- x. Chan, J. K., and Kung, I. T. (1988). Rehydration of air-dried smears with normal saline. Application in fine-needle aspiration cytologic examination. *American Journal of Clinical Pathology* 89: 30–34.
- xi. Chan, J.K., and Kung, I.T. (1988). Rehydration of air-dried smears with normal saline, application in fine needle aspiration cytologic examination. *American Journal Clinical Pathology*; 89(1):30-4.
- xii. Christensen, E., Bofin, A., Gudmundsdóttir, I. and Skogvoll, E. (2008). Cytological diagnosis of basal cell carcinoma and ac- tinic keratosis, using Papanicolaou and May-Grünwald-Giemsa stained cutaneous tissue smear. *Cytopathology*:19: 316–322.
- xiii. Cohen, T., Krieger, P.A., and Naryshkin, S. (2003). A practical guide to Papanicolaou smear rescreens. *Cancer Cytopathol*; 84:130-137.
- xiv. Damast, k., Shari, A., Takiar, S.U., Vinita, W., McCarthy, P., and Shirley, E.L. (2016). Treatment of each stage vaginal cancer. *Gynecological oncology reports*: 17; 89-92.
- xv. De Luna, R., Eloubeidi, M.A., Sheffield, M.V., Eltoum, I., Jhalan N., Jhala D., Chen, V.K., and Chhieng, D.C. (2002). Comparison of ThinPrep and conventional preparations in pancreatic fine-needle aspiration biopsy. *Diagnostic Cytopathology*, 30(2):71–76.
- xvi. Demirkiran, F., Yavuz, E., Erenel, H., Bese, T., Arvas, M., and Sanioglu, C. (2012). Which is the best technique for endometrial sampling? Aspiration (pipelle) versus dilatation and curettage (D&C). *Archives of Gynecology and Obstetrics*; 286:1277–82.
- xvii. Dey, P., Luthra, U.K., George, J., Zuhairy, F., George, S.S., and Haji, B.I. (2000). Comparison of ThinPrep and conventional preparations on fine needle aspiration cytology material, *ActaCytol*, 2000, 44(1):46–50.
- xviii. Drury, R.A., and Wallington, E.A. (1980). Carleton's histological technique. 5th ed. London: *Oxford University press*; 335-353.
- xix. Duggan, M.A., Khalil, M., Brasher, P.M., and Nation, J.G. (2006). Comparative study of the ThinPrep Pap test and conventional cytology results in a Canadian cohort. *Cytopathology*. 17(2):73-81.
- xx. Dunne, E.F., and Park, I.U., (2013). HPV and HPV- associated diseases infectious diseases clinics of north America: 27 (4); 765-78.
- xxi. Edward R.L., and Brady, H.U., (1925). Normal respiratory tract and inflammatory conditions in diagnostic cytopathology. *Gynaecological oncology reports*.: 57-69.
- xxii. Fox, C.H., Turner, F.G., Johnson, W.L., and Thornton, W.N. (1962). Endometrial cytology. A new technique. *American Journal of Obstetrics and Gynecology*. 83:1582–91.
- xxiii. Genetics of Breast and Ovarian Cancer (2014). National Cancer Institute.
- xxiv. Gill, G.W. (1999). What is the Papanicolaou stain anyway. *Scan*: 10(2). 4-7.
- xxv. Halperin, S., Edward, C., Brady, T., and Luther, O. (1925). *Principles and practice of radiation oncology*: 1412.
- xxvi. Hayama, F.H., Motta, A.C.F., Silver Ade, P.G., and Migliari, D.A. (2005). Liquid-based preparations versus conventional cytology: specimen adequacy and diagnostic assessment in oral lesions. *Medical Oral Pathology*: 10(2):115–122.
- xxvii. Hees, K., and Lebeau, P.B. (1995). Comparison of conventional and Thin-Prep preparations of mucoid cytology samples. *Diagnostic Cytopathology*. 12:181-185.
- xxviii. Hemlatha, A.N., Pai, M.R., and Raghuveer, C.V. (2006). Endometrial aspiration cytology in dysfunctional uterine bleeding. *Indian Journal of Pathology and Microbiology*; 49:214–7.
- xxix. Hoffman, W., Barbara, L., Schorge, Q., John, O., Schafer, R.T., Joseph, I., Halvorson, E., Liss, M., Bradshora, Z., Karen, D., Cunningham, F., and Gary, U. (2012). *Epithelial Ovarian Cancer, Williams Gynecology*: 853-878.
- xxx. Issacs, T.H., Ross, and Tom, F.H. (1978). Cytological evaluation of the endometrium in women with postmenopausal bleeding. *American Journal of Obstetrics and Gynecology*; 131:410–5.

- xxxi. J.r., Charles E. AndCarraher (2014). Carraher's polymer chemistry (ninth ed.). Boca Raton; Taylor and Francis: 385.
- xxxii. Jones, C.A. (1999). Papanicolaou staining of air-dried smears, value in rapid diagnosis. *Cytopathology*: 7(5):333-9.
- xxxiii. Kimura, I., Togashi, K., Nishimura, K.T., suda, Y., Yamashita, K., and Shibata, T. (2003). Endometrial cysts: diagnosis with MR imaging. *Radiology*: 180:73–8.
- xxxiv. Kobelin M.H., Kobelin C.G., Burke L., Lavin P., Niloff J.M., Kim Y.B. (1998) Incidence and predictors of cervical dysplasia in patients with minimally abnormal Papanicolaou smears. *Obstetrics and Gynaecology*: 92:356-9.
- xxxv. Koss, L.M.D. (1979). Diagnostic cytology and its Histopathological bases. 3rd ed. Philadelphia: Lippincott Company; 1187-1257.
- xxxvi. Koss, L.G. (2006). Tumours of the urinary tract in urine and brushings. In Diagnostic Cytology and its Histopathologic Basis. Koss LG, Melamed MR (eds). *Philadelphia: JB Lippincott Co*: 777–846.
- xxxvii. Kumar, V., Abbas, A.K., Fausato, N., and Mitchell, R.N. (2007). Saunders Elsevier: 718-721.
- xxxviii. Linda, R.V., and Vorvick, M.D.(2008). Medline Plus- Vaginitis test –wet mount.
- xxxix. Mabuchi, H., Seiji, M.D., Kawano, E., Matine, R.L., Fumiaki, V.J., Kurodo, T., and Hiromasa, w. (2015). *Journal of obstetrics and gynaecological research*: 41(1); 156-161.
- xl. Macchia, W., Sankaranarayanan R., Budukh, A. M. and Rajkumar, R. (1998). Effective screening programmes for cervical cancer in lowand middleincome developing countries. *Bull World Health Organization*; 79:954- 62.
- xli. Makuza J.D., Nsanzimana S., MuhimpunduM. A., Pace L.E., Ntaganira J., David James Riedel D. J. (2015) Prevalence and risk factors for cervical cancer and pre-cancerous lesions in Rwanda *The Pan African Medical Journal*.22:26.
- xlii. McKee, G. (2003). Urinary tract cytology. In: Diagnostic Cytopathology. Gray W, McKee G (eds). *Edinburgh: Churchill Livingstone*: 471–97.
- xlili. Nasuti, J.F., Tam, D., and Gupta, P.K. (2001). Diagnostic value of liquid- based (Thinprep) preparations in non-gynaecologic cases. *Diagnostic Cytopathology*. 24:137-141.
- xliv. National Cancer institute. *Defining Cancer*, (2014).
- xlvi. Nicol, T.L., Kelly, D., Reynolds L., and Rosenthal, D.L. (2000). Comparison of TriPath thin-layer technology with conventional methods on non-gynecologic specimens, *ActaCytologica*, 44(4):567–575.
- xlvi. Orell, S.R., and Lindholm, K. (1986).Breast. In: Fine Needle Aspiration Cytology, 4th edn. Sterett GF, Whitaker D (eds). Philadelphia: Elsevier; 165–225.
- xlvi. Ovarian Cancer Prevention. *NCL*, December (2013) from the original on July (2014).
- xlvi. Ovarian Cancer Risks and Causes. Cancer research UK. 15 (2014).
- xlix. Pan, Z., Yang, G., Wang, Y., He, H., Pang, X., and Gao Y. (2015). Thinprep plus Papanicolaou Stain Method Is More Sensitive than Cytospin-Coupled Wright Giems Stain Method in Cerebrospinal Fluid Cytology for Diagnosis of Leptomeningeal Metastasis from Solid Tumors. *PLoS ONE* 10(4):432-437.
- l. Papanicolaou, G. N. (1940). A new procedure for staining vaginal smears. *Science*:95: 438–439.
- li. Papillo, J.L., and Lapen, D. (1994).Cell yield. ThinPrep vs. cytocentrifuge.*ActaCytologica*; 38:33-36.
- lii. Perzin, Y., and Sevetsky, M. D., (2011). FRCSC, Medical Director, Cervix Check, Cancer Care Manitoba. New Cervical Screening Technologies: Liquid-Based Cytology and HPV Testing presentation, Accessed on 7- 10- 2013.
- liii. Pick, J.M., Van diest, P.J., and Verheijen, R.H. (2008). An alternative hypothesis in experimental medicine and biology. *Ovarian carcinogenesis*: 622; 79-87.
- liv. Powers, C.N. (1998). Diagnosis of infectious disease, a cytopathologist's perspective. *Clinical Microbiology reviews*: 11(2):341-365.
- lv. Prat J; FIGO Committee on Gynecologic Oncology. Staging Classification for Cancer of the Ovary, Fallopian Tube, and Peritoneum: Abridged Republication of Guidelines From the International Federation of Gynecology and Obstetrics (FIGO). *Obstetrics and Gynecology* 2003; 126:171–174.
- lvi. Proe, D. (2000). Sub optimal staining, a recipe for disaster .scan:11(1) 2-8
- lvii. Rana, D.N., O'Donnell, M., Malkin, A., and Griffin, M. (2001). A comparative study: conventional preparation and ThinPrep 2000 in respiratory cytology, *Cytopathology*, 12(6):390–398.
- lviii. Refetoff, T., Omigbodun, A.O., Ogunniyi, J. O. and Adelusi, B., (2003). Cervical intraepithelial neoplasia in a sexually transmitted diseases clinic population of Nigeria. *Journal of Obstetric Gynaecology East Central Africa*; 7:74-76.
- lix. Saleh, H.A., Clayman, L., and Masri, H. (2008).Fine needle aspiration biopsy of intraoral and oropharyngeal mass lesions. *Cytological journal*: 28;5:4.
- lx. Schachter, A., Beckerman, A. ,Bahary, C., and Joel-Cohen, S.J. (1980). The value of cytology in the diagnosis of endometrial pathology. *ActaCytologica*; 24:149–52.
- lxi. Seiden, Michael (2015). Gynaecological Malignancies.MGraw- Hill medical.
- lxii. Shidham, V.B., Kampalath, B., and England, J. (2001). Routine air dring of all smears prepared during fine needle aspiration and intraoperative cytology studies, an opportunity to practice a unified protocol offering the flexibility of choose a variety of staining methods. *Actacytologica*: 45(1) 60-8.
- lxiii. Singh, G., Mathur, S.R., Iyer, V.K., and Jain, D. (2013). Cytopathology of neoplastic meningitis: A series of 66 cases from a tertiary care center. *Cytological journal*: 10: 13.

- lxiv. Sterrett, G.F., Frost, F.A., and Whiteaker, D. (2003). Tumours of lung and mediastinum in diagnostic cytopathology: 171-131.
- lxv. Terney, C.M, and Han, J. (2014). Postcoital bleeding a review on etiology, diagnosis and management. *Obsterics and gynaecology international*.
- lxvi. The Royal College of Pathologists.Histopathology and Cytopathology of Limited or No Clinical Value. London: The Royal College of Pathologists; 2005.
- lxvii. Thorax (2001). British thoracic society bronchoscopy guidelines committee. *British thoracic society guidelines for diagnostic flexible bronchoscopy*;56 11-21.
- lxviii. Willems, J.S., and Lowhagen, T. (2008). Fine needle aspiration cytology in thyroid disease. *Clinical and Endocrinology Metabolism*: 10(2)247-66.
- lxix. World Cancer Report (2014). World Health Organization, chapter 5-12.
- lxx. Ylagan, L.R., and Zhai, J. (2005). The value of ThinPrep and cytospin preparation in pleural effusion cytological diagnosis of mesothelioma and adenocarcinoma.*Diagnostic Cytopathology*: 32: 137–144.