

Una experiencia de 10 años con 3274 aspiraciones con aguja fina en la edad pediátrica en un hospital docente en la Habana. (A ten-year experience on 3274 pediatric fine needle aspiration cytologies at a Major Teaching Hospital in Havana).

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Resumen

Objetivos: Describir y validar una experiencia de 10 años con citologías aspirativas con aguja fina (CAAF) en niños y adolescentes. Diseño del estudio: La CAAF fue realizada principalmente como citopunción por un patólogo. Los archivos de citopatología del Hospital Pediátrico William Soler fueron revisados y se seleccionó los registros de los pacientes menores de 21 años. Se creó una base de datos con la información usando el programa Excel. Se revisó también los datos clínicos e histopatológicos. La base de datos fue analizada y se realizó cálculos, gráficos y tablas. Resultados: 3274 CAAF fueron realizadas con predominio del sexo masculino (55%) y de niños menores de 7 años.

Los Ganglios linfáticos, Partes blandas, Tiroides y Mama fueron los sitios más frecuentemente puncionados. Hubo 80.9% de diagnósticos benignos, 6% malignos, 2.4% sospechosos de malignidad y 10.7% insuficientes para diagnóstico. 630 citologías fueron correlacionadas: 69 fueron insuficientes, 321 verdaderos negativos, 184 verdaderos positivos, 19 falsos negativos y 37 falsos positivos. La sensibilidad, especificidad, precisión, valores predictivos positivo y negativo y prevalencia fueron 90.6%, 89.6%, 90%, 83.2% 94.4%, y 36.1% respectivamente. 4 complicaciones de las punciones en órganos profundos fueron observadas y el índice de complicaciones fue de 0.01%. Conclusión: La CAAF es una excelente técnica diagnóstica en niños y adolescentes como en

adultos.

(Objectives: To describe and to validate a 10-year experience in pediatric fine needle aspiration cytology (FNAC). Study design: FNAC was done mainly in a non aspirating form by a pathologist. Archives of cytopathology at William Soler Pediatric Hospital were reviewed and patients punctured younger than 21 years were selected. A data base was created with patients' information using Excel program. Histopathology and clinical data were also reviewed. Data base was analyzed, figures, graphics and tables were done as needed. Results: 3274 fine needle cytologies were done. There was a predominance of male patients (55%) and children younger than seven years. Lymph nodes, soft tissue, thyroid, and breast were the most frequently punctured sites. There were 80,9% benign diagnosis, 6% malignant, 2,4% suspicious for malignancy and 10,7% insufficient. 630 cytologies were correlated: 69 were insufficient, 321 true negative, 184 true positive, 19 false negative, and 37 false positive. Sensibility, specificity, accuracy, positive and negative predictive values and prevalence were 90.6%, 89.6%, 90%, 83.2%, 94.4%, and 36.1%. Four deep organ puncture complications were observed and complication rate was 0,1%. Conclusion: FNAC is an excellent diagnostic technique in pediatric age as in adulthood.)

Introduccion

Fine needle aspiration cytology (FNAC) in adult age is a well recognized diagnostic technique with accepted value in management of tumoral and pseudotumoral processes 1-3. Nevertheless its use in children and teenagers is still underused 4-6.

Some reports about FNAC employment in the early years of life advocate its value in a very similar way as in adulthood 7-10 but many pediatricians reject it arguing poor child cooperation during the puncture, the need of sedation, the inability to obtain an adequate sample and the intrinsic diagnostic difficulties of small round blue cell tumors of infancy.

It is our purpose to demonstrate our experience with the use of FNAC in a major children hospital and prove its statistical value. We haven't found any previous pediatric report with such a diversity of sites punctured.

Material y Métodos

Previous approbation of this research by the local institutional review board, archives of cytopathology at William Soler Pediatric Hospital were reviewed from January 1992 to September 2002. An Excel data base was made with data from all punctured patients younger than 21 years. Later, histopathology archives were reviewed to correlate cytology and histology. Evolutive clinical data (1-118 months) of punctured cases without biopsy were also correlated. Statistical results were obtained analyzing the data base. Figures, tables and graphics were done as needed 11. The punctures without anesthesia were mainly done by a pathologist with experience and special interest in this area according to established standards 1,3,12.

The cytologic samples obtained by puncture were expelled and smeared onto glass slides and stained with May Grünwald Giemsa or Hematoxylin-Eosin. Diagnosis was done knowing clinical data and pertinent laboratory and image information when available. Thoracic and mediastinal punctures under thoracoscopic guide were performed by surgeons under anesthesia. Deep abdominal tumors were punctured with or without real time ultrasonography but without guide, sedation or anesthesia.

Cytology diagnoses were classified as benign (neoplastic or not), malignant (with or without histogenetic approach), suspected of malignancy (intermediate diagnostic category not enough to make a malignant diagnosis of certitude) and insufficient.

Resultados

During the almost 11 years that the investigation last 3274 punctures were done on 3187 patients. A progressive increase in FNAC demand was observed during the first years (Figure 1). Later a stabilization in the number of punctures per year was noticed. A decrease in 2002 is related to the investigation dead-line date investigation in September 2002.

In figure 2 it is shown a distribution of punctures by sex and age. Males were 1815 (55%) and females were 1450 (44%). Sex was unknown in 9 patients.

There was a mild predominance of male children between one and seven years old. In older ages a discrete predominance of female sex was also observed. The youngest patient was 2 days old, the mean age was 5,9 years and the median age was 10 years.

Race was stated in 1179 (70%) white patients, 317 (19%) mestizo and 179 (11%) black children. Race was unknown in 1599 children.

In **Table I** it is shown the number of punctures done according to the site. The lymph nodes were the predominant organs examined followed by the soft tissue, thyroid and breast. It is important to notice a predominance in abdominal punctures 119 (3,6%) over thoracic area 37 (1,1%). The abdomen was punctured 3 times more than the thorax.

We observed four deep FNAC complications: a cardiac tamponade, two hemoperitoneum (only one required surgery and died secondary to sepsis) and a massive digestive bleeding (that also required surgery). The complication rate was 0,1%.

In **Figure 3** it is depicted the number of FNAC by site according age groups (one to 18 years). Lymph nodes and soft tissue punctures decreased with age increase. On a contrary thyroid and breast punctures increased with age.

From the total of 3274 FNAC done, 353 (10,7%) were insufficient, 2651 (80,9%) were benign, 198 (6%) were malignant, and 72 (2,4%) were suspected of malignancy. Our malignant/benign ratio was 13,3. The most frequent tumors were Non Hodgkin lymphoma, Hodgkin lymphoma, leukemia, nephroblastoma, neuroblastoma, Ewing's sarcoma, osteosarcoma and rhabdomyosarcoma. In 630 punctures, cytohistopathological or clinicocytopathological correlation was possible. 69 punctures were insufficient, 321 true negative, 184 true positive, 19 false negative and 37 false positive. No patient was oncosurgically treated without a corroborative biopsy of the malignant nature of the illness. Statistical values calculated in this series were: sensibility 90,6%, specificity 89,6%, efficacy 90%, positive predictive value 83,2%, negative predictive value 94,4% and prevalence 36,1%.

Table I
Distribution of punctures by organ or site

Organ or site	Number	Percentage	Organ or site	Number	Percentage
Abdomen	33	1,01	Paratestis	5	0,15
Spleen	4	0,12	Soft tissue	839	25,63
Endoral	65	1,99	Prostate	1	0,03
Lymph nodes	1658	50,64	Retroperitoneum	12	0,37
Salivary glands	63	1,92	Kidney	19	0,58
Liver	22	0,67	Adrenal gland	13	0,40
Breast	188	5,74	Testis	14	0,43
Mediastinum	35	1,07	Thyroid	217	6,63
Bone	68	2,08	Thorax	2	0,06
Ovary	11	0,34	Bladder	3	0,09
Pancreas	1	0,03	Vulva	1	0,03

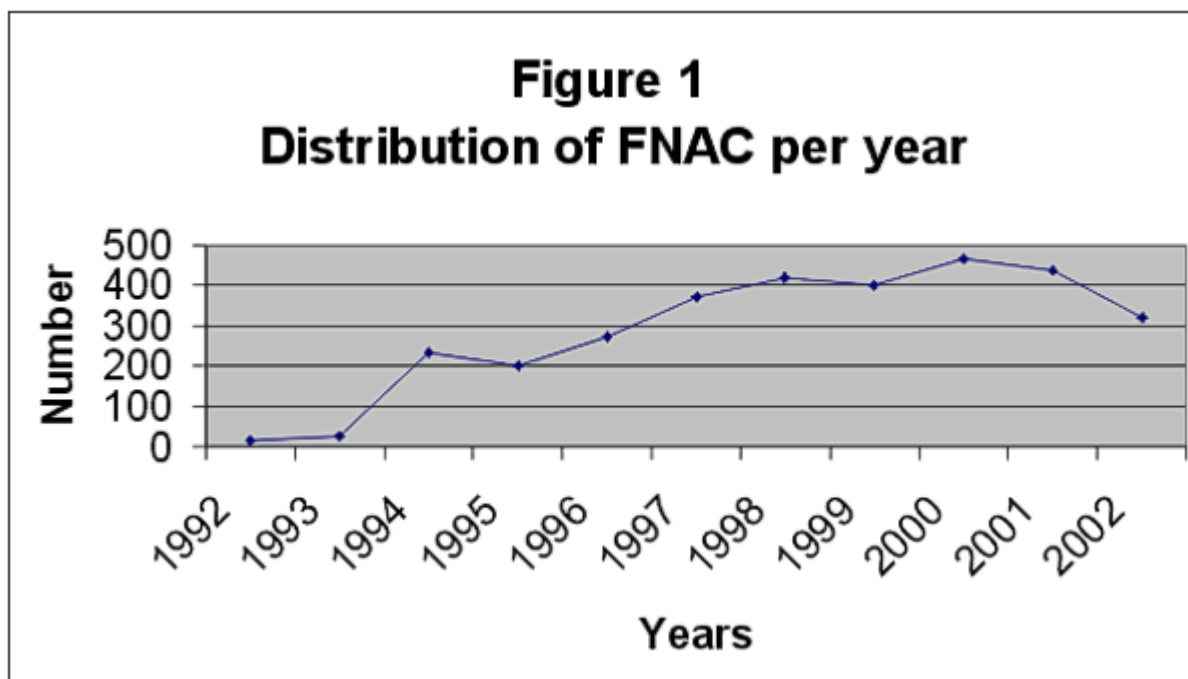


Figure 1.

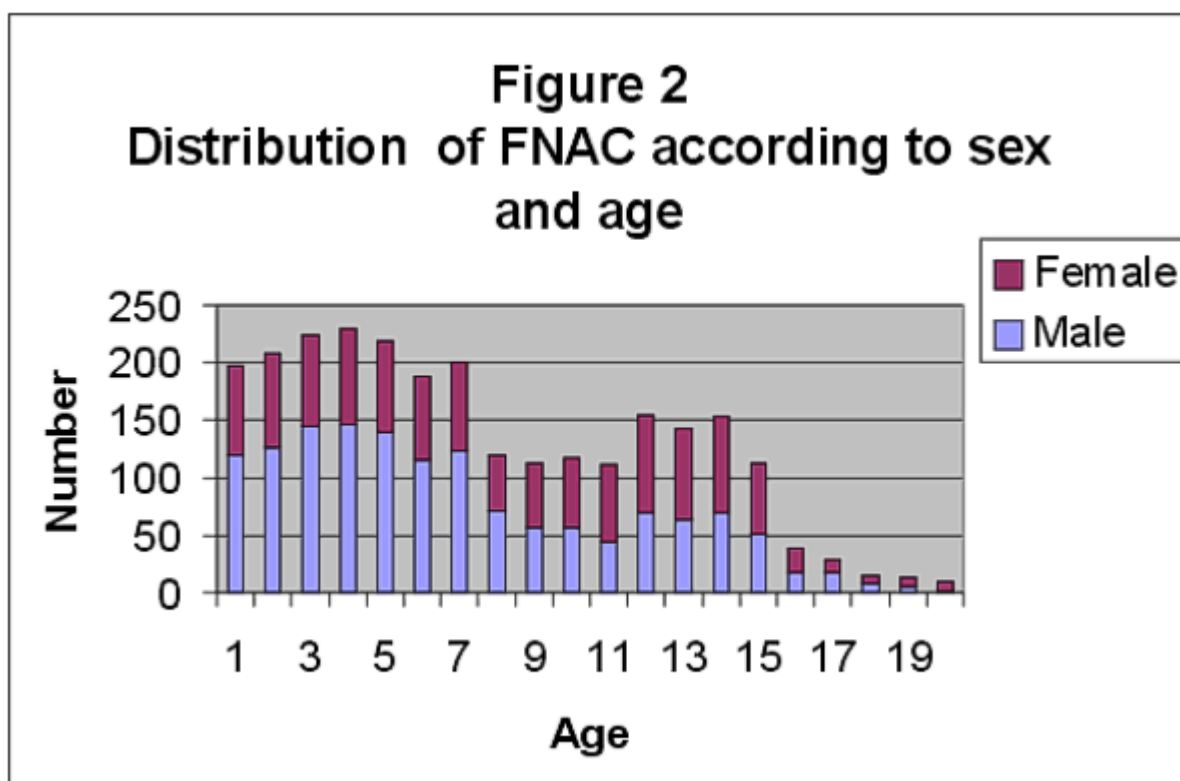


Figure 2.

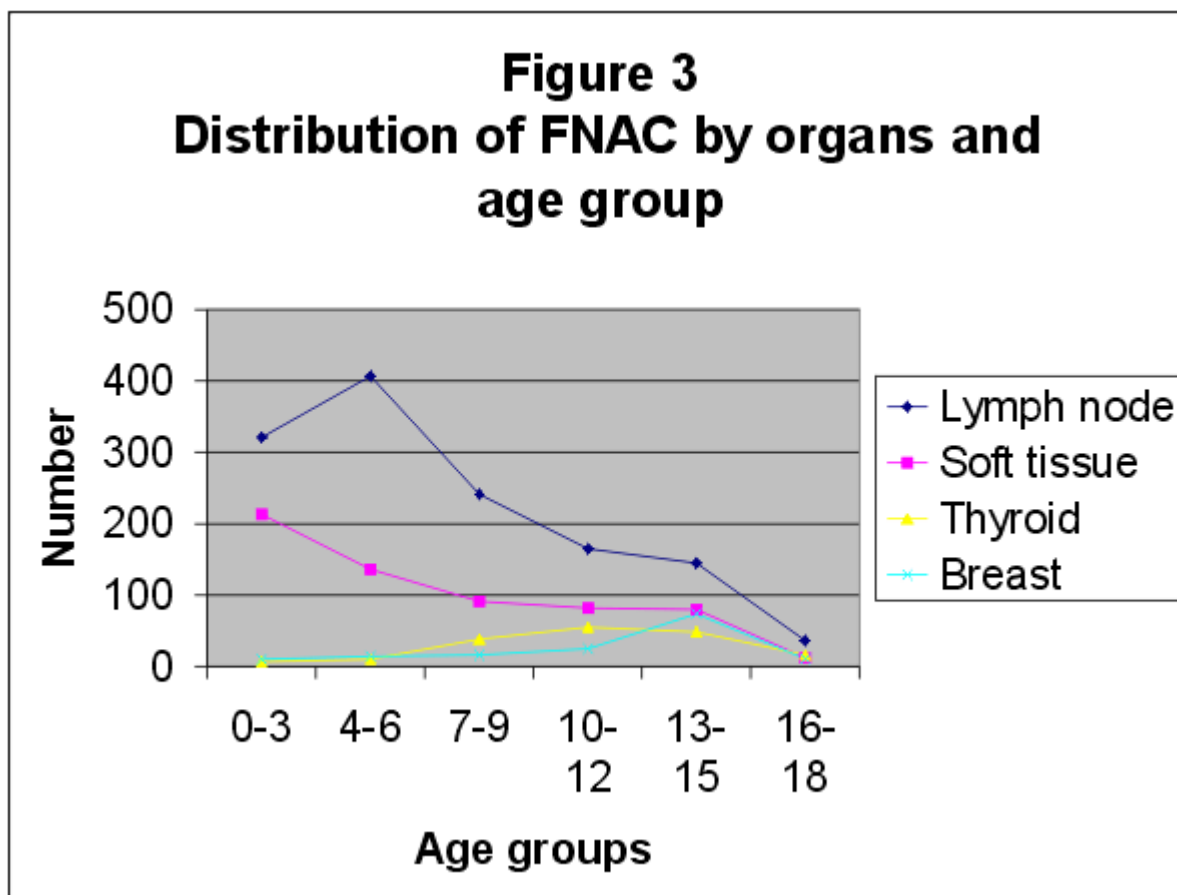


Figure 3.

Discusión

Pediatric FNAC is nowadays an increasingly used technique. Literature review shows that pure pediatric series are rare, some of them covering up to 300 patients of different ages. It has been our objective to analyze and present a first report with 3274 FNAC done in 22 sites or organs.

We had an increasing FNAC demand in the first years of the study as Howell LP reported⁵ and most of our patients were 7 years old or younger. Our mean age was very similar as that reported by Orford JE et al¹³ but less than the age reported by Gamba PG et al¹⁴. Our median age was also very close to the age reported by Silverman JF et al (10,5 years)⁹. The youngest and oldest patients in this later report were also as ours: one day and 18 years⁹. Almeida MM et al, Gamba PG et al, Millar AJW et al, and Smith MB et al¹⁴⁻¹⁷ had a narrower spectrum of age than ours as well as Silverman's⁹.

We found a predominance of the male sex in our study as has been noticed by other authors^{8,14,15,17,18}. Half and quarter of our punctures corresponded to lymph nodes and soft tissue. Wakely PE et al reported that their most frequent benign and malignant diagnosis depended on these sites and thyroid⁸. Eisenhut CC et al had a higher percentage of lymph nodes, breast, thyroid and salivary gland punctures than ours, but less of soft tissue¹⁸. We had also the same distribution of punctures by site and ages¹⁸. Gamba PG et al had lymph nodes, and head and neck as the most frequent sites¹⁴.

We punctured 3 times more abdomen sites than thorax and mediastinum. The incidence of pediatric abdominal tumors is higher than the incidence of mediastinum and lung tumors¹⁹.

We had 10,7% of insufficient punctures, less than many authors^{7-9,14,15,17,20-30}. There is a wide variation of percentages of benign and malignant diagnosis in pediatric FNAC reports that depends on the design and objectives of the study itself. In our series we had a very low percentage of malignant diagnosis^{7-10,13-18,20-30}. Only Eisenhut CC et al had a lower percentage of malignancy 4.5%¹⁸. This difference may be due to the characteristics of the cases we punctured: mainly ambulatory children

and teenagers sent from external medical services. A very similar situation was found in the benign cytologic category. We had 80,9% of negative punctures, also a very high value. Most authors reported values from 81% to 8,6% ^{9,13-15,20,30}. Only Eisenhut CC et al had a higher value than ours 95,5% ¹⁸. Suspicious diagnosis was 2,4% in our series. Values of suspicious category oscillate from 0% to 17,5% ^{8,14,15,20,24,30}. Our benign/malignant rate was high but lower than the figure reported by Eisenhut CC et al of 22 ¹⁸. Our most frequent malignant tumors were also reported by Tayler SR et al and Schaller RT et al ^{22,25}. Our series had a sensibility of 90,6%. Only Diament MJ et al reported a sensibility lower than ours ²³. The rest of the authors had a higher value up to 100% ^{7-10,13-18,20-22,24-30}. Our specificity was 89,6%. Verdeguer A et al reported a value lower than ours: 80% ²⁰. The other authors also reported higher values, even 100% ^{7-10,13-18,21-30}. We had 4 important FNAC complications with a very low incidence. Geisinger had stated in his cytopathology book the exceedingly low incidence of FNAC complications in pediatrics ³¹. The complication rate of this series was very low at 0,1%. Valkov I et al, Millar AJ et al, Jereb B et al, Schaller RT et al, Gamba PG et al, and Diament MJ et al reported no complications in their series composed by 25-96 patients ^{7,14,16,23,25,26}. These reports had 1,8-0,7% of the number of our punctures, then the probability of complications would be practically null.

Conclusiones

In conclusion: FNAC can be used in pediatrics in a similar way as it is employed in adult age.

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