AN AUDIT OF SEROLOGICAL TESTS CARRIED OUT AT CLINICAL LABORATORY OF AYUB TEACHING HOSPITAL, ABBOTTABAD

Sirajuddin Hassan Ally, Ayesha Ahmed, Ruhila Hanif*

Department of Pathology and *Biochemistry, Ayub Medical College, Abbottabad

Background: Clinical audit is an important tool for reviewing and improving the quality of service in clinical laboratories. Here we present an audit of total serology test requests and the frequency of positive tests out of these in a calendar year. **Methods:** This is an audit of serology tests carried out at Microbiology section of Clinical Laboratory of Ayub Teaching Hospital, Abbottabad. We counted all the serology test requests for the year 2004. These tests requests were grouped month wise. The frequency of positive tests out of the total test requests were calculated. The tests included Widal, Toxoplasma, Brucella, Anti DNA, Anti Nuclear factor (ANF), Rheumatoid Arthritis Factor (RAF), HIV, HBsAg, HCV, Intra Chromatographic Technique for tuberculosis (ICT-TB), Purified Protein Derivative (PPD), Venereal Disease Research Laboratory (VDRL) test, Anti-Streptolysin-O-test (ASOT) and pregnancy test. **Results and Conclusions:** This audit gives a clear idea of trends of test requests in our hospital. It reflects accuracy of clinicians' judgment in some tests and failure in others, prevalence of different diseases, seasonal variation in number of test requests for some tests and impact of awareness campaigns on attitude of clinicians towards certain diseases. This will help us in planning our laboratory requirements to improve quality.
Keywords: Serology, Audit, Clinical laboratory

INTRODUCTION

'Laboratory-clinic communication' is fundamental in achieving and maintaining quality in laboratory services. Modern health care in this era of 'Evidence based medicine' has put a lot of pressure on the laboratory services too. The trend now is that laboratory medicine should follow a clinical rather than a technological logic. Appropriate test requesting and interpretation coupled with a patient-oriented vision improves the outcomes for patients, and so ensures the best cost containment strategy.[1]

Recently dramatic changes have occurred in the organization, number and type of tests, and role of medical laboratories in healthcare. The role of laboratory professionals has undergone a radical change, which calls for greater analytical accuracy, more stringent test selection, and interpretation of results.[2]

The lack of good quality research in the field not only contributes to inappropriate utilization of laboratory services but also to wasting significant resources. Evidence-based laboratory medicine tries to combat this problem by combining methods from epidemiology, biostatistics, clinical and social sciences with basic sciences to evaluate the role of investigations in clinical decision making and outcomes for patients.[3]

Evidence-based laboratory medicine aims to advance clinical diagnosis and management of diseases through systematic researching and disseminating generalisable new knowledge which meets the standards of critical review on clinically effective practice of laboratory investigations. The use of evidence in laboratory medicine requires systematically compiled databases of standardized and critically appraised information on the test characteristics and diagnostic accuracy of laboratory investigations.[4]

Service quality in medical laboratories is influenced by a number of variables. Medical laboratories have long recognized the need for total quality management that incorporates the continuous improvement of all stages, such as the pre-analytical, analytical and post-analytical phases, of the diagnostic process, in addition to the traditional internal and external quality control of analytical procedures. Based on national and international experience, continuous improvement of quality and its external assessment are of high priority in order to guarantee a reliable, effective and cost-effective diagnostic service. The process of constant questioning and reviewing the evidence for rational diagnosis of diseases provides a practical tool to identify gaps in our knowledge and thus it generates new research ideas in laboratory medicine.[5]

Clinical audit is an important tool for reviewing and improving the quality of service in clinical laboratories. Here we present an audit of total serology test requests and the frequency of positive tests in a calendar year. This will give an idea of trends of test requests in our hospital. This will help us in planning our laboratory requirements to improve quality.

MATERIAL AND METHODS

This is an audit of serology tests carried out at Microbiology section of Clinical Laboratory of Ayub Teaching Hospital, Abbottabad. This laboratory caters for a 1000 bed tertiary care hospital that is the main teaching hospital of Ayub Medical College. All the laboratory investigations from wards (in-patients) and OPD (outdoor) are referred to clinical laboratory. In addition other primary and secondary care hospitals of the area refer to this laboratory for many investigations. We counted all the serology test requests for the year 2004. These tests requests were grouped month wise. The frequency of positive tests out of the total test requests were calculated. The serology tests carried out during the year 2004 included Widal, Toxoplasma, Brucella, Anti DNA, Anti Nuclear factor (ANF), Rheumatoid Arthritis Factor (RAF), HIV, HBsAg, HCV, Intra Chromatographic Technique for tuberculosis (ICT-TB), Purified Protein Derivative (PPD), Venereal Disease Research Laboratory (VDRL), Anti-Streptolysin-O-test (ASOT) and pregnancy test.

RESULTS

The results of this audit are summarized in tables 1 to 5.

DISCUSSION

Serology laboratory is very important in diagnosis of a number of diseases.

Tuberculosis is of great public health concern globally, and the impact is most felt in developing countries of Asia and Africa. Laboratory plays a very important role in diagnosis and management (monitoring prognosis)of the disease.[6,7] An early and accurate diagnosis of TB is perhaps the most significant intervention step in TB control. Early diagnosis permits expedited treatment and limitation of spread. An effective TB laboratory program plays an essential role in the early and accurate diagnosis and appropriate treatment of TB.[8]

Table-1: Widal, Toxoplasma and Brucella tests in 2004

Month	WIDAL		TOXOPLASMA		BRUCELLA	
	Total Tests Done	Total No. of Positive (%)	Total Tests Done	Total No. of Positive (%)	Total Tests Done	Total No. of Positive (%)
January	78	37 (47.73%)	18	5 (27.77%)	52	21 (40.38%)
February	84	51 (60.71%)	20	11 (55%)	41	19 (46.34%)
March	168	74 (44.04%)	25	11 (44%)	84	28 (33.33%)
April	253	106 (41.89%)	35	13 (37.14%)	123	32 (26.01%)
May	270	116 (42.96%)	34	17 (50%)	126	30 (23.80%)
June	311	101 (32.47%)	37	17 (45.94%)	155	24 (15.48%)
July	341	104 (30.49%)	45	5 (11.11%)	117	20 (17.09%)
August	197	95 (48.22%)	29	17 (58.62%)	41	10 (24.39%)
September	332	98 (29.51%)	38	13 (34.21%)	102	10 (9.80%)
October	187	90 (48.12%)	30	14 (46.66%)	78	15 (19.23%)
November	88	34 (38.63%)	29	13 (44.82%)	55	15 (27.27%)
December	122	52 (42.62%)	32	15 (46.87%)	67	10 (14.92%)
Total	2431	958 (39.40%)	372	151 (40.59%)	1041	234 (22.47%)

Table-2: Anti DNA, ANF and RAF tests in 2004

Month	Anti DNA		ANF		RAF	
	Total Tests Done	Total No. of Positive (%)	Total Tests Done	Total No. of Positive (%)	Total Tests Done	Total No. of Positive (%)
January	34	0 (0%)	34	1 (2.94%)	45	13 (28.88%)
February	2	0 (0%)	15	0 (0%)	60	17 (28.83%)
March	3	0 (0%)	14	1 (7.14%)	68	15 (22.05%)
April	0	0 (0%)	2	0 (0%)	100	24 (24%)

May	0	0 (0%)	1	0 (0%)	94	17 (18.08%)
June	7	0 (0%)	3	0 (0%)	92	12 (13.04%)
July	23	2 (8.69%)	38	0 (0%)	122	15 (12.29%)
August	20	0 (0%)	13	0 (0%)	84	11 (13.09%)
September	26	0 (0%)	21	0 (0%)	67	20 (29.85%)
October	34	0 (0%)	23	0 (0%)	77	24 (31.16%)
November	26	1 (3.84%)	27	0 (0%)	48	12 (25%)
December	33	3 (9.09%)	31	1 (3.22%)	66	14 (21.21%)
Total	208	6 (2.88%)	222	3 (1.35%)	923	194 (21.01%)

Table-3: HIV, HBsAg and HCV tests in 2004

Month	HIV		HBsAg		HCV	
	Total Tests Done	Total No. of Positive (%)	Total Tests Done	Total No. of Positive (%)	Total Tests Done	Total No. of Positive (%)
January	22	1 (4.54%)	244	5 (3.2%)	189	17 (8.9%)
February	20	0 (0%)	229	8 (3.5%)	191	20 (10.4%)
March	64	0 (0%)	415	7 (1.6%)	384	21 (5.5%)
April	38	0 (0%)	468	13 (2.7%)	392	30 (7.7%)
May	11	0 (0%)	477	21 (4.4%)	392	23 (5.9%)
June	12	0 (0%)	584	12 (2.0%)	307	25 (8.1%)
July	15	0 (0%)	515	12 (2.3%)	455	33 (7.3%)
August	17	1 (5.88%)	525	10 (1.9%)	451	26 (5.8%)
September	24	0 (0%)	513	16 (3.1%)	455	26 (5.7%)
October	17	0 (0%)	419	8 (1.9%)	391	13 (3.3%)
November	21	1 (4.76%)	325	15 (4.6%)	301	18 (6.0%)
December	34	0 (0%)	493	13 (2.6%)	460	19 (4.1%)
Total	295	3 (1.01%)	5207	140 (2.68%)	4638	271 (5.84%)

Table-4: ICT-TB, PPD and Pregnancy tests in 2004

Month	ICT-TB		PPD		Pregnancy Tests	
	Total Tests Done	Total No. of Positive (%)	Total Tests Done	Total No. of Positive (%)	Total Tests Done	Total No. of Positive (%)
January	5	1 (20%)	15	2 (13.33%)	140	60 (42.85%)
February	7	0 (0%)	4	0 (0%)	Kits Not Available	
March	10	1 (10%)	18	0 (0%)	206	97 (47.08%)
April	18	3 (16.66%)	23	0 (0%)	191	98 (51.30%)
May	17	4 (23.52%)	12	4 (33.33%)	192	94 (48.95%)
June	15	4 (26.66%)	24	8 (33.33%)	160	95 (59.37%)
July	13	0 (0%)	38	4 (10.52%)	218	97 (44.49%)
August	2	0 (0%)	21	2 (9.52%)	70	32 (45.71%)
September	8	2 (25%)	16	4 (25%)	38	14 (36.84%)
October	11	5 (45.45%)	17	2 (11.76%)	163	78 (47.85%)
November	5	0 (0%)	4	0 (0%)	134	67 (50%)
December	10	0 (0%)	36	0 (0%)	168	79 (47.02%)
Total	121	20 (16.52%)	228	26 (11.40%)	1680	811 (48.27%)

Table-5: VDRL and ASOT tests in 2004

Month	VDRL		ASOT	
	Total Tests Done	Total No. of Positive (%)	Total Tests Done	Total No. of Positive (%)
January	26	0 (0%)	23	0 (0%)
February	18	0 (0%)	37	20 (54.05%)
March	23	0 (0%)	36	8 (22.22%)
April	33	0 (0%)	60	24 (40%)
May	29	0 (0%)	27	9 (33.33%)
June	22	0 (0%)	43	17 (39.53%)
July	20	0 (0%)	58	25 (43.10%)
August	30	0 (0%)	33	15 (45.45%)
September	24	0 (0%)	40	20 (50%)
October	20	0 (0%)	45	29 (64.44%)
November	20	0 (0%)	18	11 (61.11%)
December	24	2 (8.33%)	44	25 (56.81%)
Total	289	2 (0.69%)	464	203 (43.75%)

Laboratory tests are very important in rheumatology.[9] Knowledge of mechanisms of rheumatic diseases has a continuing influence on the introduction of many laboratory tests to be used for establishing diagnosis or monitoring the activity of rheumatic disease.[10] Among these tests the most frequent request in our laboratory was for

ASOT and a considerable number was positive. Similarly a number of laboratory tests form the mainstay of diagnosis of SLE.[11,12]

Brucellosis is a world-wide re-emerging zoonosis. Various other febrile illnesses, e.g. malaria, tuberculosis, typhoid fever and tularemia may present with the same symptoms. Therefore, clinical diagnosis is difficult to establish but effective therapy requires an early diagnosis. Thus diagnosis is usually based on indirect serological tests, and laboratory is the mainstay of correct diagnosis.[13] Similarly laboratory is the mainstay for diagnosis of enteric fever and toxoplasma gondii.[14] Nontreponemal antibody tests such as the Venereal Disease Research Laboratory (VDRL) test are carried out on serum and widely used as screening tests for syphilis.[15]

This audit gives a clear picture about prevalence of a number of diseases. A large proportion of the Widal tests requested were positive. Similarly toxoplasma, Brucella and rheumatic diseases are not uncommon too. Tuberculosis is projected as being very common but the test requests reflect that there were very few suspected cases. In addition in the majority of them test was negative.

This audit also reflects importance of accurate clinical judgment in some cases. Like in Toxoplasma the test requests were very few, but the high proportion of positive cases reflects that in a reasonable number of cases where clinicians suspected toxoplasmosis, their diagnosis was supported by a positive laboratory test. The same trend was seen in ASOT where once again a big proportion of the test requests were positive.

In addition this audit reflects presence or absence of a seasonal pattern in some of the diseases. A clear trend of seasonal surge was observed in Widal where test requests were maximum in summer months. In fact they reached a peak in 'July', the month of 'Monsoons' when the water resources become adulterated due to mixing of rain water.

The number of test requests for HBsAg and HCV made the largest proportion of serological test requests. This is result of increased awareness about these two diseases due to government and WHO sponsored campaigns directed at creating awareness in public and in the medial professionals. The clinicians seem to be overcautious as the proportion of positive results was very low, specially in case of HBsAg.

In concordance with reports from other national studies, HIV is very infrequent. Our limitation however is insufficient history provided with these cases. Therefore we cannot tell wether these tests were requested for persons in whom disease was suspected or for precaution e.g in blood donors. The number of Sexually Transmitted Diseases also seems to be less as most of the VDRL requests proved to be negative.

As in other disciplines of medicine, laboratory tests are meant to supplement a thorough history and physical examination. The clinician should have a purpose for ordering each test; to screen for a disorder, confirm a diagnosis, exclude a possible diagnosis, monitor therapy or determine prognosis.[16]

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Address For Correspondence:

Dr. Sirajuddin Hassan Ally, Department of Pathology, Ayub Medical College, Abbottabad. Pakistan

Email: ayesha@ayubmed.edu.pk