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Clinical Approach to Jaundice Patients

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***Abstrak*:** *This article aims to provide a comprehensive clinical approach to the evaluation and management of patients with jaundice, emphasizing differential diagnosis, diagnostic algorithms, and therapeutic implications through a case-based discussion. This descriptive-analytical study utilizes a case-based approach for an adult patient with jaundice. Data were obtained from clinical examination, laboratory assessment of liver function, and abdominal imaging for structural evaluation. Jaundice, characterized by yellow discoloration of the skin and sclera due to hyperbilirubinemia, can be divided into pre-hepatic, intra-hepatic, and post-hepatic jaundice. A systematic clinical approach through history taking, physical examination, and evaluation of biochemical parameters such as AST, ALT, ALP, GGT, and bilirubin fractions is crucial in determining the etiology. The case presented suggests intrahepatic cholestasis due to hepatitis, which was confirmed by laboratory and imaging studies. Early identification of the cause of jaundice is crucial for determining management and prognosis. This article emphasizes the importance of using clinical algorithms to differentiate between hepatic and obstructive causes to avoid unnecessary procedures and improve patient clinical outcomes.*

Keywords : *Clinical Approach, Jaundice Patients, Therapeutic Implications*

INTRODUCTION

Jaundice is a clinical manifestation characterized by yellow discoloration of the skin, sclera, and mucous membranes due to increased levels of bilirubin in the bloodstream. This condition reflects a disturbance in bilirubin metabolism, hepatocellular dysfunction, or bile duct obstruction. It is important to note that jaundice is nonspecific to the underlying etiology, requiring a systematic diagnostic approach to obtain a correct diagnosis and determine effective treatment (Chalmers & Matull, R., 2014; Fargo Grogan, SP, & Saguil, A., 2017) .

Various studies have shown that jaundice remains a significant diagnostic challenge, particularly in primary healthcare settings and areas with limited access to imaging technology (M. et al., 2020) . Furthermore, recent clinical reports have shown a high incidence of diagnostic delays, particularly in cases of intrahepatic jaundice mimicking obstructive manifestations (R. et al., 2022) . A current research gap is the lack of integration of simple laboratory-based and imaging-based clinical algorithms that can be widely applied in primary care settings.

The novelty of this study lies in the development of a systematic approach to jaundice patients based on actual cases, combining a history based on the Sacred Seven and Fundamental Four frameworks, comprehensive biochemical evaluation, and a practical clinical algorithm. This approach is expected to

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serve as an educational and clinical reference for healthcare professionals in distinguishing between hepatocellular and obstructive jaundice early and efficiently (Thapa et al., 2023; Yu et al., 2020).

Jaundice can occur due to several mechanisms, including cholestasis (impaired bile excretion), impaired bilirubin metabolism, and hepatocellular damage. Clinical manifestations of jaundice generally appear when serum bilirubin levels exceed 2.5–3 mg /dL. Initial evaluation involves liver function tests, including measurement of total bilirubin and its fractions (conjugated and unconjugated), as well as liver enzymes such as ALT, AST, and ALP. Total protein, albumin, and prothrombin time levels also need to be checked to assess liver synthetic capacity and predict prognosis (M. et al., 2021; Gondal & Aronsohn, A., 2016) . This issue presents a challenge for healthcare providers in differentiating hepatic and obstructive causes, especially when the clinical presentations overlap. A study by T. et al., (2021) emphasized that an algorithm-based approach considering the AST/ALT ratio, ALP dominance, and imaging findings can improve the accuracy of early diagnosis and reduce unnecessary invasive procedures. Based on this information , the aim of this study was to formulate and review a systematic clinical approach to evaluating patients with jaundice, through case analysis and integration of laboratory and imaging data, to accelerate diagnosis and improve management accuracy.

METODOLOGI

This study uses a descriptive clinical approach with a case study method, which aims to formulate and review a systematic approach in evaluating patients with jaundice symptoms. This approach was implemented through retrospective observation of one case of an adult patient treated at Mohammad Natsir Solok Regional General Hospital in 2024. Data collection techniques were carried out triangulationally, including reviewing medical records, laboratory results (total bilirubin and its fractions, AST, ALT, ALP, GGT, albumin, prothrombin time), and abdominal imaging such as hepatobiliary ultrasonography and CT scan to assess the etiology of jaundice. The main variable in this study was the clinical manifestation of jaundice as the dependent variable, with the etiology of the cause (pre-hepatic, intra-hepatic, and post-hepatic) as the independent variable. Other variables considered included biochemical parameters, imaging results, and patient demographic characteristics such as age and gender as control variables.

Data analysis was conducted qualitatively using an interpretive approach to clinical findings and supporting findings, which were reviewed within the framework of a diagnostic algorithm. The data were then synthesized based on relevant literature and clinical practice guidelines to assess the effectiveness of the approach in differentiating between hepatic and obstructive jaundice. This analysis is expected to provide educational and practical contributions to accurate and efficient clinical decision-making for medical personnel in primary and secondary care.

The following is a graph of this research method:

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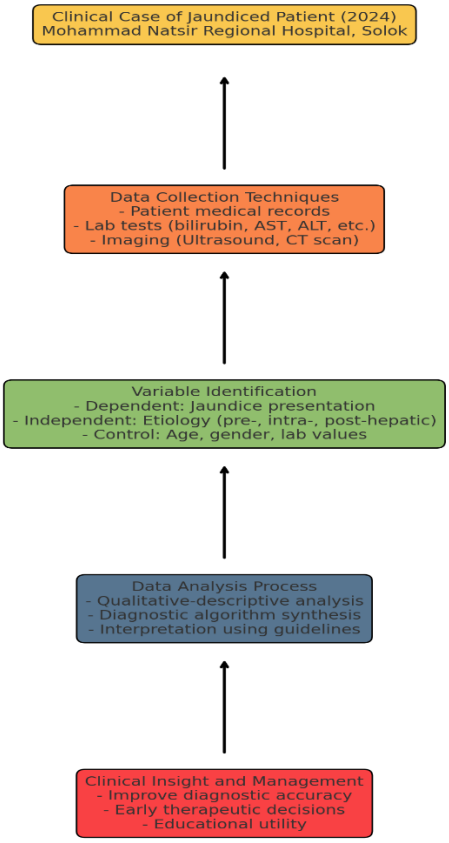
Figure 1. Clinical Approach Flowchart in Evaluating Jaundiced Patients



RESULTS AND DISCUSSION

Definition and Clinical Significance of Jaundice

Jaundice is a clinical manifestation characterized by yellow discoloration of the skin, sclera, and mucous membranes due to increased levels of bilirubin in the bloodstream. This condition can be detected clinically when total serum bilirubin levels exceed 2–3 mg/dL. Clinically, the term "jaundice" is used to describe the visible color change, while "hyperbilirubinemia" refers biochemically to elevated levels of bilirubin in the blood. This distinction is important because jaundice can be a sign of various pathological processes that affect the production, metabolism, and excretion of bilirubin in the body.

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Epidemiology and Demographic Patterns

The prevalence of jaundice varies by age group and gender. In full-term infants, physiological jaundice is found in approximately 20% in the first week of life, primarily due to immaturity of liver function in conjugating bilirubin. Meanwhile, in older infants , the main cause of jaundice is often related to bile duct stones, drug-induced liver disease, or hepatobiliary malignancies (Abbas et al., 2016). Gender differences also play a role, with men being more susceptible to cirrhosis due to alcohol and chronic hepatitis B, while women are more likely to experience cholelithiasis and gallbladder cancer.

Classification and Etiology of Jaundice

Clinically, jaundice is classified into three categories based on the location of the disorder: pre-hepatic, intra-hepatic, and post-hepatic.

1. Pre-hepatic jaundice is generally caused by increased bilirubin production due to massive hemolysis, for example in hemolytic anemia, malaria, or blood transfusion reactions.
2. Intra-hepatic jaundice occurs due to hepatocyte damage, causing disruption of the conjugation and excretion processes of bilirubin, such as in viral hepatitis, cirrhosis, and drug-induced hepatitis.
3. Post-hepatic jaundice is usually caused by bile duct obstruction (cholelithiasis, pancreatic cancer, stricture) which blocks the flow of bile and causes reflux of conjugated bilirubin into the blood.
4.

Pathophysiology of Jaundice

There are four main mechanisms in the pathophysiology of icterus (Gofur et al., 2022):

1. Excessive bilirubin production, for example in hemolysis (sickle cell anemia, thalassemia, transfusion incompatibility, autoimmune).
2. Impaired uptake of unconjugated bilirubin by hepatocytes due to disruption of the albumin transfer mechanism to liver cells.
3. Bilirubin conjugation disorders, such as in Gilbert's syndrome, Crigler-Najjar types I and II, which are caused by deficiency of the enzyme glucuronyltransferase.
4. Decreased excretion of conjugated bilirubin, which occurs in intrahepatic (hepatitis, cirrhosis, drug hepatotoxicity) or extrahepatic (gallstones, cancer, stricture) cholestasis.

The first to third mechanisms generally cause an increase in unconjugated bilirubin, while the fourth mechanism causes an increase in conjugated bilirubin.

Clinical Diagnostic Approach

The diagnosis of jaundice can be made through anamnesis, physical examination, and supporting tests. However, before the history is taken, patient identification, including name, age, and gender, should be noted. Age and gender often provide clues to the likelihood of a diagnosis. For example, acute viral hepatitis type A is found primarily in children and young adults. Gallbladder disease is more common in middle age and women. Conversely, liver cirrhosis or hepatoma is more common in men (Pavlovic Markovic et al., 2022). The diagnosis of jaundice begins with the history and physical examination, followed by supporting tests.

1. Anamnesis includes two approaches, namely the “Sacred Seven” (chronology, location, quality, quantity of symptoms, aggravating/alleviating factors, and accompanying symptoms) and the “Fundamental Four” (current, past, family, social history).

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2. Physical examination focuses on skin/scleral discoloration, enlarged liver, spleen, and signs of cirrhosis (gynecomastia, spider nevi).
3. Laboratory tests include total/direct/indirect bilirubin, liver enzymes (AST, ALT, ALP, γGT), albumin, and prothrombin time.
4. Imaging tests such as ultrasound to detect bile duct dilation, CT/MRI to view masses or stones, and ERCP for visualization and diagnostic/therapeutic intervention.

Bilirubin Metabolism

Bilirubin metabolism involves three phases (Sulaiman, 2017; Widodo & Kusbin, 2023)

1. Pre-hepatic: Heme from old erythrocytes is converted to biliverdin, then to unconjugated bilirubin via the enzyme biliverdin reductase.
2. Intra-hepatic: Unconjugated bilirubin is taken up by hepatocytes and conjugated with glucuronic acid by the enzyme UDP-glucuronosyltransferase (UGT), becoming water-soluble conjugated bilirubin.
3. Post-hepatic: Conjugated bilirubin is excreted into the bile and intestines, converted by bacteria into urobilinogen and stercobilin.

Disturbances in any of these phases cause jaundice according to the location of the abnormality.

Management of Jaundice Based on Etiology

Management of jaundice must be adjusted to the cause:

1. Pre-hepatic jaundice: Metalloporphyrins are used to inhibit bilirubin production.
2. Hepatocellular jaundice: Steroids for autoimmune hepatitis, interferon for chronic hepatitis B/C, liver transplantation for terminal liver failure. Vitamin K is given for hypoprothrombinemia.
3. Post-hepatic obstructive jaundice: Management includes procedures such as biliary stents, endoscopic papillotomy, stone extraction, or surgery. Other support includes cholestyramine for pruritus, vitamin A, a low-fat diet, and the use of MCT oil.

Complications of Jaundice

Complications of jaundice include:

1. Pruritus: Occurs due to the accumulation of bile salts and pruritogenic mediators such as histamine (Joseph & Samant, 2023).
2. Hyperlipidemia and xanthomas: Cholestasis causes increased serum cholesterol and deposition in the skin/tissues.
3. Cirrhosis and liver failure: Are consequences of delayed diagnosis and treatment of severe jaundice.

Prognosis

The prognosis depends largely on the cause:

1. Cholelithiasis: Good, with slow symptom progression.
2. Choledochal cyst: Good after excision, but still at risk of cholangiocarcinoma.
3. Hepatitis A: Generally heals spontaneously, risk of death is low (0.4 %).
4. Acute hepatitis B: 90% complete recovery.
5. Hepatitis C: >80% become chronic, risk of cirrhosis/hepatocellular carcinoma.
6. Fulminant hepatitis: Requires liver transplantation, prognosis depends on the speed of intervention.

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Systematic Clinical Case Analysis and Diagnostics

old male patient presented with a chief complaint of yellow discoloration of the skin and sclera, accompanied by fatigue, anorexia, and dark urine for the past week. Past medical history did not indicate alcohol consumption, hepatotoxic drugs, or previous viral infections. Physical examination revealed mild hepatomegaly and marked icteric coloration of the conjunctiva and skin. Laboratory values showed significantly elevated total bilirubin (8.6 mg /dL), a predominance of conjugated bilirubin (6.2 mg/dL), and elevated ALT (426 IU/L), AST (370 IU/L), and ALP (230 IU/L). An abdominal ultrasound showed a homogeneous liver echostructure without bile duct dilation, suggesting intrahepatic cholestasis. The combination of clinical, laboratory, and imaging findings suggested that the cause of jaundice was acute viral hepatitis with cholestatic features. This approach is in accordance with recent studies that emphasize the importance of integrating liver biochemistry and non-invasive imaging results in differentiating the etiology of jaundice (Lin J.; Huang, X., 2022; Wang H.; Liu, L., 2023) . Determination of the liver enzyme pattern (hepatocellular vs. cholestatic) is crucial in differentiating intrahepatic jaundice from extrahepatic obstructive jaundice (Zhou P.; Chen, S., 2021) .

The Role of Clinical Algorithms in Differentiating the Etiology of Jaundice

The application of an algorithm based on a combination of the AST/ALT ratio, ALP dominance, bilirubin fractions, and ultrasound results has been shown to improve the accuracy of early jaundice diagnosis. A study by (Habib F.; Khan, MI, 2020) showed that in intrahepatic jaundice, an AST/ALT ratio <1 is often found in acute hepatitis, while ALP values are only mildly elevated, unlike obstructive jaundice where ALP predominates and is accompanied by bile duct dilation on ultrasound. A study by Riedl M.; Zimmer, T., (2021) developed an algorithm based on six biochemical parameters to differentiate hepatocellular and cholestatic jaundice, which was shown to increase diagnostic sensitivity by up to 87%. A similar approach was used in this study, strengthening the position of clinical algorithms as a primary tool in decision-making.

Relevance of Supporting Examinations: Ultrasound and Advanced Imaging

Abdominal ultrasound is an important initial imaging modality in evaluating jaundiced patients. In a study by Patel Y.; Sohal, N., (2023) , ultrasound was able to detect bile duct dilation with 89% accuracy, and was the primary modality in differentiating extrahepatic obstruction from hepatocellular disorders. In this case, the ultrasound findings without duct dilation, with homogeneous liver parenchyma, supported the diagnosis of intrahepatic cholestasis. CT and MRI are used in advanced cases or if ultrasound does not provide conclusive information (Chen Y.; Liu, J., 2020) .

Prognostic Evaluation and Management

In the context of acute cholestatic hepatitis, the prognosis is generally good with supportive therapy. There are no signs of hepatic insufficiency (e.g., encephalopathy or ascites). Prothrombin time is normal, and no invasive intervention is required. Studies by Baral P.; Sapkota, B., (2022) emphasize that in viral hepatitis with a cholestatic presentation, clinical resolution generally occurs within 4–8 weeks with close monitoring. Choleretic drugs such as ursodeoxycholic acid are only given for severe pruritus (Rahmani H.; Alam, K., 2021) .

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Contribution to Clinical Practice and Education

The application of an algorithm-based approach to this patient successfully avoided unnecessary invasive follow-up examinations such as ERCP or liver biopsy. This systematic approach supports the findings of Rahbar K.; Amini, A., (2023) , which showed that real-life case-based medical education with algorithm integration can improve clinical decision-making accuracy by up to 30% compared to conventional methods. This study also adds educational references to medical clinical practice at the secondary care level.

CONCLUSIONS

A systematic clinical approach to evaluating patients with jaundice has proven crucial for improving diagnostic accuracy and management effectiveness. The analyzed case studies demonstrate that the integration of a structured history, a thorough physical examination, liver biochemical parameters, and non-invasive abdominal imaging such as ultrasound can effectively differentiate between intrahepatic and posthepatic jaundice. The application of a diagnostic algorithm based on a combination of AST/ALT values, ALP dominance, and bilirubin fractions facilitates rapid and efficient determination of the etiology of jaundice and prevents unnecessary invasive procedures. The results of this study confirm that timely diagnosis, supported by structured clinical and laboratory data, significantly contributes to therapeutic decision-making and improves patient prognosis. Therefore, an algorithm-based clinical approach applied to jaundice patients not only has educational value for healthcare professionals but also has a direct impact on the quality of healthcare services, particularly in the context of primary and secondary care settings.

REFERENCES

Abbas, M.W., Shamshad, T., Ashraf, M.A., & Javaid, R. (2016). Jaundice: a basic review. *International Journal of Research in Medical Sciences* , *4* (5), 1313–1319. https://doi.org/10.18203/2320-6012.ijrms20161196

Baral P.; Sapkota, B., R. . A. (2022). Cholestatic Hepatitis: Clinical Approach and Management Outcomes. *Asian Journal of Medical Sciences* , *13* (5), 63–68. https://doi.org/10.3126/ajms.v13i5.44329

Chalmers & Matull, R., J. (2014). *Jaundice in Book Acute Med A Symptom-Based Approach* . 259–267.

Chen Y.; Liu, J., W. . G. (2020). Diagnostic value of imaging modalities in hepatobiliary obstruction. *Radiology International* , *10* (2), 45–51.

Fargo Grogan, S. P., & Saguil, A., M. V. (2017). Evaluation of Jaundice in Adults. *American Family Physician* , *95(3)* , 164–168.

Gofur, NRP, Gofur, ARP, Gofur, RNRP, Kahdina, M., & Putri, HM (2022). Jaundice Clinical Manifestation and Pathophysiology: A Review Article. *Biomedical Journal of Scientific & Technical Research* , *41* (4), 32938-32941.

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Gondal & Aronsohn, A., B. (2016). A Systematic Approach to Patients with Jaundice. *Seminars in Interventional Radiology* , *33(4)* , 253–258. https://doi.org/10.1055/s-0036-1592331

Habib F.; Khan, MI, MM . R. (2020). Biochemical differentiation of jaundice in clinical settings. *Journal of Clinical Laboratory Analysis* , *34* (1), e23012. https://doi.org/10.1002/jcla.23012

Lin J.; Huang, X., L. . S. (2022). Biochemical algorithmic approach in adult patients with jaundice. *Clinical Gastroenterology Review* , *18* (3), 120–128.

Patel Y.; Sohal, N., T.R. Z. (2023). Ultrasonography in the Evaluation of Obstructive Jaundice: A Clinical Perspective. *Journal of Diagnostic Imaging* , *9* (4), 88–94.

Pavlovic Markovic, A., Stojkovic Lalosevic, M., Mijac, DD, Milovanovic, T., Dragasevic, S., Sokic Milutinovic, A., & Krstic, MN (2022). Jaundice as a Diagnostic and Therapeutic Problem: A General Practitioner's Approach. *Digestive diseases (Basel, Switzerland)* , *40* (3), 362–369. https://doi.org/10.1159/000517301

Rahbar K.; Amini, A., M. . H. (2023). Integrating clinical algorithms in medical education: Effects on student diagnostic accuracy. *Medical Education Today* , *27* (2), 175–182.

Rahmani H.; Alam, K., R. . S. (2021). Therapeutic options in cholestatic hepatitis: Focus on supportive care. *Journal of Hepatology and Liver Diseases* , *16* (2), 44–50.

Riedl M.; Zimmer, T., M. . S. (2021). Development of a diagnostic algorithm for hyperbilirubinemia. *European Journal of Internal Medicine* , *91* , 65–71. https://doi.org/10.1016/j.ejim.2021.06.015

Roche, S. P., & Kobos, R. (2004). Jaundice in the adult patient. *American family physician* , *69* (2), 299–304.

Sulaiman , A. (2017). Clinical Approach to Jaundice Patients. In: Setiati S, editor. Textbook of Internal Medicine Volume II, 6th Edition. VI. Jakarta: Interna Publishing , 1937–42

Wang H.; Liu, L., Y. . T. (2023). Biochemical Markers in the Differential Diagnosis of Hepatic vs. Hepatic Obstructive Jaundice. *Hepatology Research* , *53* (1), 10–17. https://doi.org/10.1111/hepr.13781

Widodo, ST, & Kusbin, TBA (2023). Clinical Approach to Neonatal and Infant Jaundice. Mirror of the World of Medicine, 50(6), 332–338. https://doi.org/10.55175/cdk.v50i6.921

Zhou P.; Chen, S., M. . L. (2021). Differentiating intrahepatic vs extrahepatic jaundice: A case-based review. *Chinese Medical Journal* , *134* (15), 1872–1878.