Worcestershire Acute Hospitals NHS Trust

Obstetric Fluid Administration Guideline

This guidance does not override the individual responsibility of health professionals to make appropriate decision according to the circumstances of the individual patient in consultation with the patient and /or carer. Health care professionals must be prepared to justify any deviation from this guidance.

Introduction

The administration of fluid in the pregnant population can be challenging and complex with significant risk. However despite this there is no national or local guidance on the use of fluid in pregnancy. This guideline attempts to address this and is for use in the antenatal and postnatal wards and delivery suite.

This guideline is for use by the following staff groups :

Midwifery Staff
Junior Obstetric Clinical Staff

Lead Clinician(s)

Dr Aled Morgan — SpR Anaesthetics
Dr Joanna Marriott — Consultant Anaesthetist

Approved by *Maternity Quality Governance* on: 20th September 2019

Key amendments to this guideline

Date	Amendment	Approved by:
September 2019	New document approved	Maternity Quality Governance

Guideline for Fluid Replacement in Labour and Post Partum

Introduction

Pregnancy results in significant physiological adaptation combined with potential pathological changes such as pre-eclampsia and cardiomyopathy which can make fluid mananagement difficult in a patient population that would otherwise be young, healthy and low risk. A clear understanding both of the physiological changes and the interactions with perinatal pathology is essential for the safe administration of prescribed fluid. This guideline seaks to lay out a clear and systematic method for assessment and treatment of fluid deficit in order to empower staff and improve patient safety.

Physiology

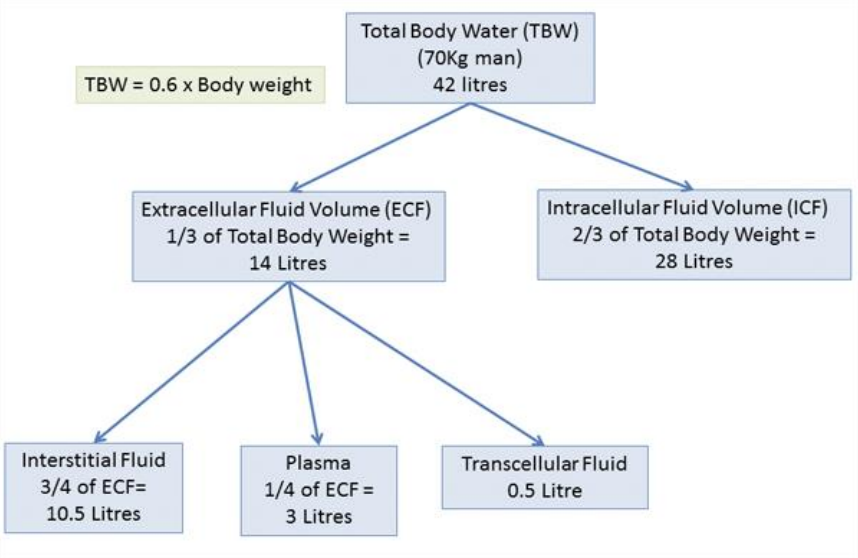
Pregnancy is associated with numerous significant changes in physiology which can affect fluid balance and assessment of fluid deficit. Over the course of the pregnancy the total blood volume increases by upto 50% and there is and increased volume and strength to cardiac contractions which can mask hypovolaemia. This increased demand on the heart can reveal preexisting impairment and cause disease to manifest.

From 38 weeks on aortocaval compression can also significantly effect the function of the cardiovascular system causing profound hypotension in the supine position. Post delivery there is rapid release of blood into the vascular system by the contracting uterus and the relief of aortocaval compression.

There is a 50% increase in renal blood flow in pregnancy causing an increased filtration rate of the blood. This is seen on blood tests as a reduced urea and creatinine (upto 40%). For this reason normal or mild elevation can indicate significant renal impairment, often due to dehydration or pre-eclampsia.

Complexity and controvacey

The complexity in management and assessment of fluid balance is due to difficulty in estimating the total body fluid content and water distribution amongst different compartments of the body as detailed below:



Fluid administered to the plasma compartment either intravenously or orally via the gut will freely move to all the other compartments; this is of benefit for maintenance fluid but not in resuscitation when the plasma compartment is the target.

The rate of movement depends on concentration gradients of molecules in the fluid. Dextrose is the rapidly redistributed and so of least benefit to the plasma compartment as the glucose is rapidly metabolised leaving nothing to slow its redistribution. Crystalloids like Normal Saline and Hartmanns have an intermediate duration of action. Colloids like albumin and blood have the longest duration. Synthetic colloids where created to improve the duration that fluid stayed in the blood vessels. However their cost and complications (renal impairment, anaphylaxis and coagulopathy) limit their use and they are not recommended.

Route of Administration

Fluid replacement in delivery suite is through either the oral or intravenous routes each with benefits and downsides.

Oral replacement is more physiological, it avoids rapid administration and overload of an impaired system. Oral intake takes advantage of the body's own homeostatic mechanisms to maintain balance of water and electrolytes meaning less risk of over or under replacement. However it is slow and not suitable for resuscitation, it relies on patient motivation and is difficult to monitor and quantify. It is important however in patients where fluid balance is a concern to try to monitor intake by documenting volumes in jugs, cups or bottles. (WAHT-TP-094: Eating and Drinking in Labour)

Intravenous replacement however is rapid and quantifiable. It allows for proper assessment of response by looking at changes in heart rate, respiratory rate and BP in the time after administration. Rise in respiratory rate in particular is often the earliest sign of clinical deterioration. Use of boluses either 250ml, 500ml or 1000ml in shock should be followed by close monitoring of heart rate, respiratory rate and blood pressure. Often, in the young and healthy obstetric patient, blood pressure is maintained until a late stage in hypovolaemia and so fall in heart rate is a better assessment of response. Use of intravenous fluid is further complicated by the effect of the administration of electrolytes especially when using Normal Saline which can have significant complications. As a more physiological fluid Hartmanns is less at risk of this.

Indications

Maintenance: ideally oral replacement guided by the patients own physiological cues eg thirst. Alternatively with IV fluid if NBM. The normal requirement of fluid in a healthy adult is 25-30ml/kg/day using the patient's actual body weight.

Resuscitation: use of fluid boluses to replace losses. It is important to identify and correct the cause so that no further losses prevent improvement.

- Rapid 500ml bolus of an balanced crystalloid such as Hartmann's
- 250ml if there is risk of cardiac impairment.
- Assess for >10% improvement in heart rate or blood pressure
- This suggests there is still a deficit and further boluses need to be given.
- If a good response is maintained then adequate resuscitation has been achieved.
- Patients receiving resuscitation fluid should be catheterised to monitor urine output closely

- Improvement in urine output suggests a rehydrated system
- Maximum 2000ml total fluid administration without improvement requires senior Obstetrician and Anaesthetist review.

Sepsis: as in resuscitation replacement should be as boluses titrated against the vital signs until a sustained improvement is shown. (WAHT-TP-094: Detection, investigation and management of maternal sepsis)

Epidurals: fluid management here is aimed at offsetting relative hypovolaemia due to the vasodilation effect of the epidural. Fluid administration should be cautious and it's important to avoid repeated boluses to manage hypotension as this won't fix the underlying cause and early anaesthetic input should be sought.

Dehydration: often demonstrated by a low urine output or ketones on urine dip. In an otherwise well patient who can eat and drink, dehydration should be managed by oral fluid administration alone. In the absence of deranged vital signs, oral fluid challenges with 250-500mls of water is more physiological and lower risk than liberal use of intravenous fluid.

Assessment of Deficit

Assessment of the patient's likely fluid and electrolyte needs taking the following approach.

- History: previous limited intake, thirst, losses, comorbidities.
- Clinical examination: pulse, BP, capillary refill, JVP, oedema (peripheral/pulmonary), postural hypotension.
- Clinical monitoring: WOW chart, fluid balance charts, weight.
- Laboratory assessments: FBC, urea, creatinine and electrolytes.

Measuring known losses if possible can also guide resuscitation, by weighing swabs/pads, measuring suction content, measuring vomit and bowel losses.

When losses can be calculated the total should be added to the normal 24hr fluid requirement in order to determine the total requirement for the day. The patient's intake and output must be accurately documented on the fluid balance chart during ongoing assessment and resuscitation.

If the patient is showing signs of compromise then titrated boluses should be used as guided by vital signs including urine output, heart rate, BP and respiratory rate.
It is important to ensure that the patient is passing more than 0.5ml/kg/hr of urine as this is a good marker of organ perfusion and function. If they pass less than this for more than 2 hours then it must be escalated to the obstetric or outreach team.

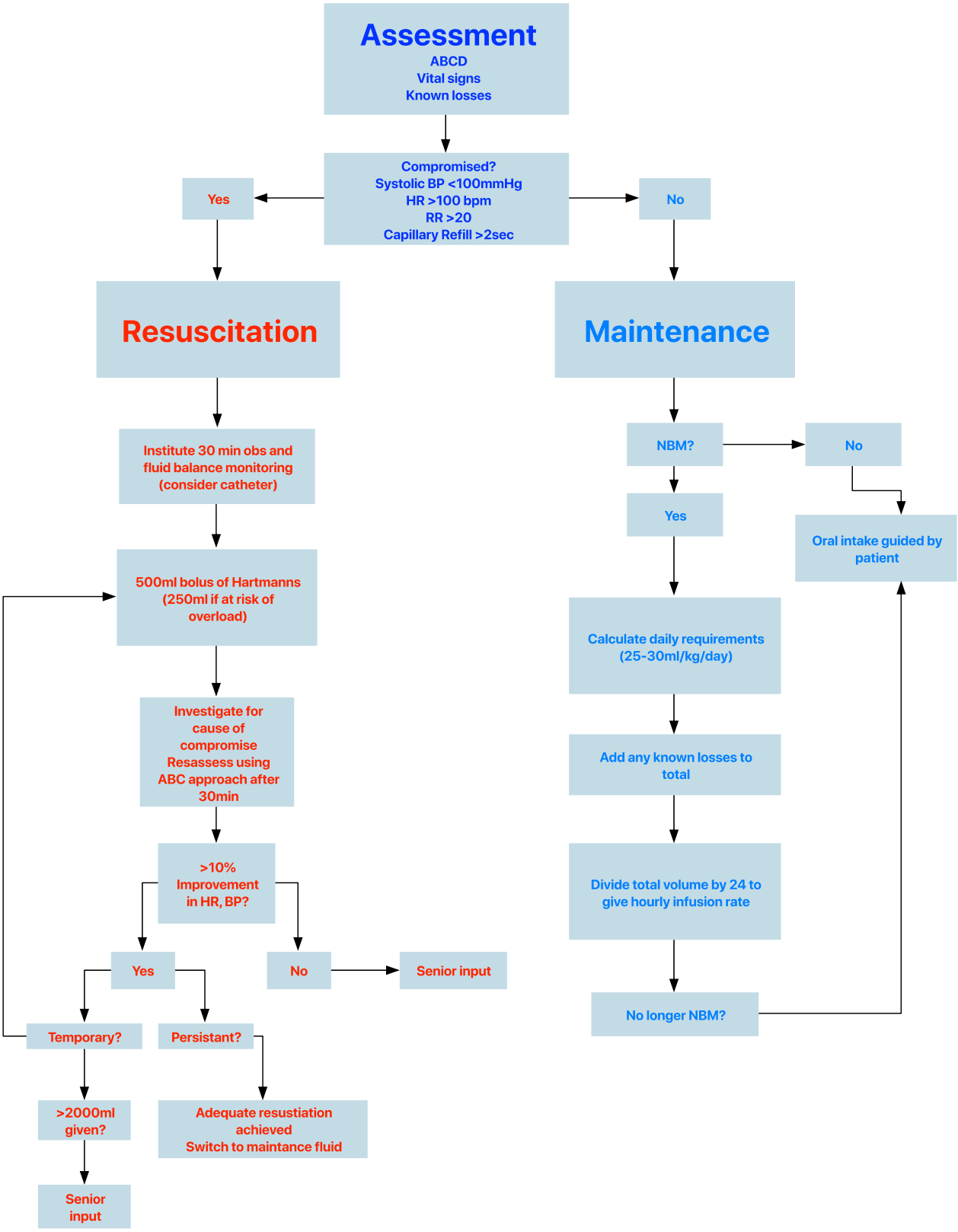
Assessment of Deficit

There are patients who fluid replacement is made more complicated by co-existing disease.

Preeclampsia: these patients are relatively hypovolaemic but due to the pathophysiology of PIH their cardiovascular and renal systems are at risk of compromise if large volumes fluid are given. Therefore they are fluid restricted to avoid pulmonary oedema and overload. However in cases complicated by haemorrhage or sepsis the conflicting fluid demands of the two conditions make management difficult and so fluid administration should be guided by senior input.

CVS disease: obstetric patients can both have pre-existing cardiovascular disease (valvular heart disease, heart failure, coronary artery disease) and can develop cardiac impairment due to the pregnancy itself (cardiomyopathy, PE). These patients can be very sensitive to fluid administration and so use should be cautious and guided by Anaesthetic and Cardiology input.

Flow Chart for Assessment and Administration of Fluid



Affix Patient Label here or record:

Name: .....

NHS No:

Hosp No:

D.O.B: D D / M M / Y Y Y Y Male ☐ Female ☐

OBSTETRICS FLUID BALANCE CHART

NHS
Worcestershire
Acute Hospitals
NHS Trust

Date: .....

Ward: .....

Patient Weight: ..... kg

Target urine output (0.5ml/Kg/Hr): ..... ml

If urine output falls below target output for 2 consecutive hours escalate to Obstetric Team/Outreach.

If after 2 litres of fluid the physiological parameter has not improved escalate to the anaesthetist.

	INTAKE							OUTPUT					
Time	Oral	FLUIDS (Insulin, Abx, Anti-hypertensives, Other)					Running Total	Vomit or aspirate	Blood Loss (inc.PV)	Drains	Urine	Running Total (urine)	Running Total (all losses)
		Hartmanns	Blood	Oxytocin									
0800													
0900													
1000													
1100													
1200													
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0500													
0600													
0700													

24 HOUR INTAKE: ☐ **TOTAL 24 HR OUTPUT (inc. insensible loss)** ☐ **BALANCE (+/-)** ☐

TO BE FILED IN WOMEN'S HOSPITAL HELD MATERNITY HEALTH RECORD

Date:	Time:	Designation:
Name:		Signature:

PF WR5323 Obstetrics Fluid Balance Chart Version 1 Page 1 of 2

References

Bedson, R. and Riccoboni, A. (2014). Physiology of pregnancy: clinical anaesthetic implications. *Continuing Education in Anaesthesia Critical Care & Pain*, 14(2), pp.69-72

Nice.org.uk. (2019). *Overview* | *Intravenous fluid therapy in adults in hospital* | *Guidance* | *NICE*. [online] Available at: https://www.nice.org.uk/Guidance/CG174 [Accessed 7 Aug. 2019].

Hoste, E., Maitland, K., Brudney, C., Mehta, R., Vincent, J., Yates, D., Kellum, J., Mythen, M. and Shaw, A. (2014). Four phases of intravenous fluid therapy: a conceptual model †. *British Journal of Anaesthesia*, 113(5), pp.740-747.

Gwinnutt, M. (2010). BODY FLUIDS - PART 1 ANAESTHESIA TUTORIAL OF THE WEEK 184. *Anaesthesia Tutorial Of The Week*, 184, pp.1 - 8.

WAHT-TP-094: Detection, investigation and management of maternal sepsis

WAHT-TP-094: Eating and Drinking in Labour

Monitoring Tool

This should include realistic goals, timeframes and measurable outcomes.

How will monitoring be carried out?

Who will monitor compliance with the guideline?

Page/ Section of Key Document	Key control:	Checks to be carried out to confirm compliance with the policy:	How often the check will be carried out:	Responsible for carrying out the check:	Results of check reported to: *(Responsible for also ensuring actions are developed to address any areas of non-compliance)*	Frequency of reporting:
	WHAT?	**HOW?**	**WHEN?**	**WHO?**	**WHERE?**	**WHEN?**
	These are the 'key' parts of the process that we are relying on to manage risk. We may not be able to monitor every part of the process, but we MUST monitor the key elements, otherwise we won't know whether we are keeping patients, visitors and/or staff safe.	What are we going to do to make sure the key parts of the process we have identified are being followed? (Some techniques to consider are; audits, spot-checks, analysis of incident trends, monitoring of attendance at training.)	Be realistic. Set achievable frequencies. Use terms such as '10 times a year' instead of 'monthly'.	Who is responsible for the check? Is it listed in the 'duties' section of the policy? Is it in the job description?	Who will receive the monitoring results? Where this is a committee the committee's specific responsibility for monitoring the process must be described within its terms of reference.	Use terms such as '10 times a year' instead of 'monthly'.

References (Bullet point all references listed)

All references should be 'Harvard' referenced, eg,

A book by a single author:

- Seedhouse, D. (1997) *Health promotion: philosophy, prejudice and practice.* Chichester, John Wiley.

Contribution List

This key document has been circulated to the following individuals for consultation;

Designation

This key document has been circulated to the chair(s) of the following committee's / groups for comments;

Committee

Supporting Document 1 - Equality Impact Assessment Tool

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Appendix- 1 Equality Impact Assessment Tool

To be completed by the key document author and attached to key document when submitted to the appropriate committee for consideration and approval.

		Yes/No	Comments
1.	**Does the policy / guidance affect one group less or more favourably than another on the basis of:**		
	Age		
	Disability		
	Gender reassignment		
	Marriage and civil partnership		
	Pregnancy and maternity		
	Race		
	Religion or belief		
	Sex		
	Sexual orientation		
2.	**Is there any evidence that some groups are affected differently?**		
3.	**If you have identified potential discrimination, are any exceptions valid, legal and / or justifiable?**		
4.	**Is the impact of the policy / guidance likely to be negative?**		
5.	**If so can the impact be avoided?**		
6.	**What alternatives are there to achieving the policy / guidance without the impact?**		
7.	**Can we reduce the impact by taking different action?**		

NB:
Where an inappropriate, negative or discriminatory impact has been identified please proceed to conduct a Full Equality Impact Assessment and refer to Equality and Diversity Committee, together with any suggestions as to the action required to avoid / reduce this impact.

Advice can be obtained from the Equality and Diversity Leads in HR and Nursing Directorates (details available on the Trust intranet).

Supporting Document 2 – Financial Impact Assessment

To be completed by the key document author and attached to key document when submitted to the appropriate committee for consideration and approval.

	Title of document:	Yes/No
1.	Does the implementation of this document require any additional Capital resources	
2.	Does the implementation of this document require additional revenue	
3.	Does the implementation of this document require additional manpower	
4.	Does the implementation of this document release any manpower costs through a change in practice	
5.	Are there additional staff training costs associated with implementing this document which cannot be delivered through current training programmes or allocated training times for staff	
	Other comments:	

If the response to any of the above is yes, please complete a business case and which is signed by your Finance Manager and Directorate Manager for consideration by the Accountable Director before progressing to the relevant committee for approval.